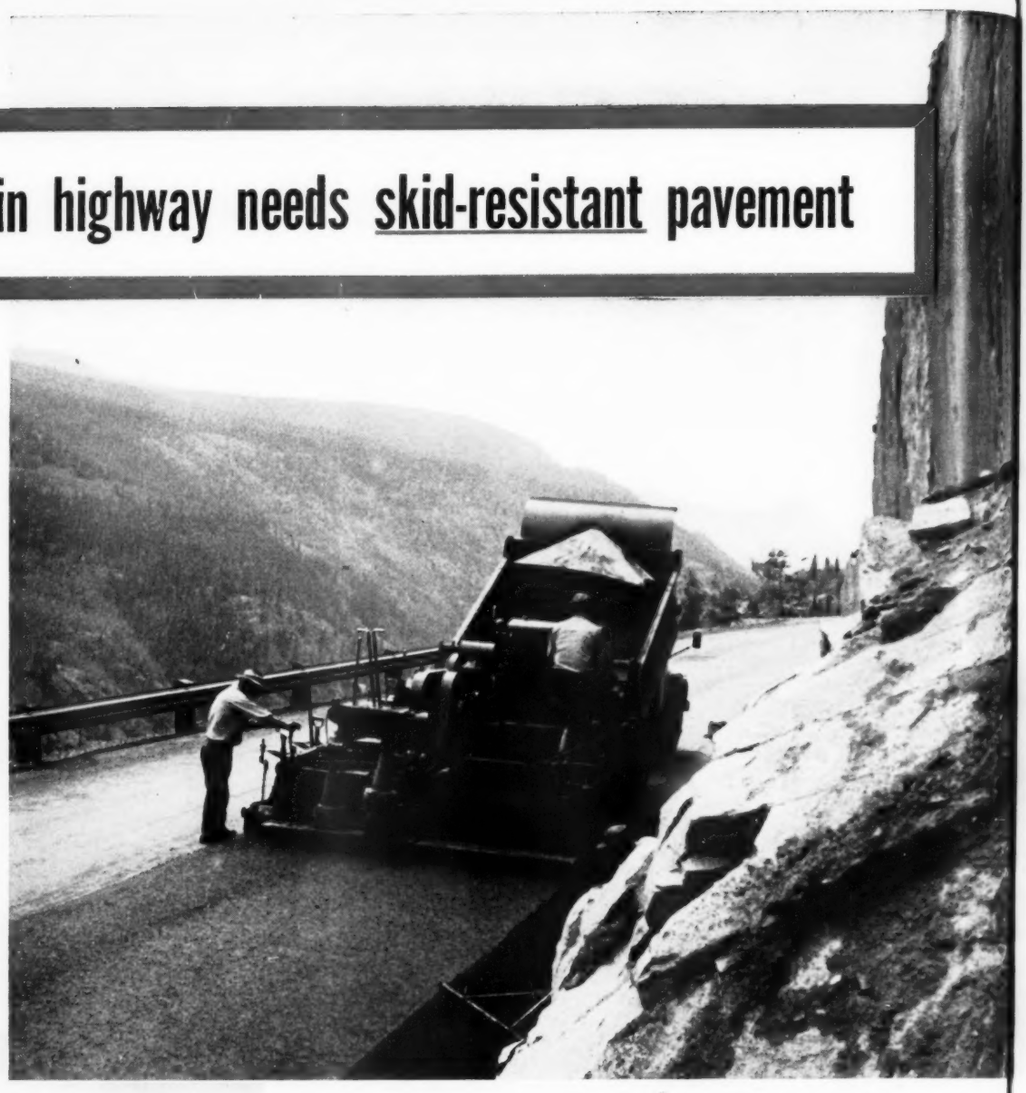
NOVEMBER 1956

Contractors and Engineers

magazine of modern construction

Glendo Dam, Wyoming
Page 6

Rocky Mountain highway needs skid-resistant pavement



Constructing skid-resistant Texaco Asphaltic Concrete pavement on U. S. Route 550, where this highway crosses the Molas Divide in Colorado at an elevation of 10,000 feet.

CONTRACTORS

Lowdermilk Brothers Construction Company, Denver, Colo.

Sterling Sand and Gravel Company, Fort Collins, Colo.

Completed Texaco Asphaltic Concrete surface at the left and the 6-inch broken stone base at the right.

U. S. Route 550 crosses the Molas Divide near Silverton, Colo., about 10,000 feet above sea level. On the curves and grades of such a mountain highway, dependable skid-resistance is an exceptionally important quality in a pavement.

A hot-mix Texaco Asphaltic Concrete pavement has been constructed on this 6.8 mile section of US-550. Laid to a compacted thickness of two inches, this skid-resistant, rugged wearing surface is supported by a six-inch foundation of crushed stone. The Texaco asphalt surface and the stone base form a completely flexible pavement from the subgrade up, which is capable of absorbing heavy traffic year after year, with a minimum of maintenance.

Hot-mix Texaco Asphaltic Concrete is one of many heavy-duty, intermediate and low-cost types of construction for highways, streets, airports and parking areas obtainable with Texaco asphaltic products. Helpful information about the methods and materials recommended for all these types is supplied in two free booklets. Copies may be obtained without obligation from our nearest office.

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TEXACO
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TEXACO ASPHALT

Contractors and Engineers

magazine of modern construction

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NOVEMBER 1956

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editorial

Another step in transportation

Within the past month, commercial helicopter service got a boost in the country's two largest cities. The first commercial heliport in Manhattan, located at West 30th Street and the Hudson River, was put into operation by the Port of New York Authority. This midtown dockside heliport now has regularly scheduled mail and cargo service to the metropolitan area's three major airports—La Guardia, Newark, and Idlewild. Passenger service will start as soon as operational experience is developed. In Chicago, the first commercial helicopter passenger service has been inaugurated between a Loop hotel and the city's two major airports.

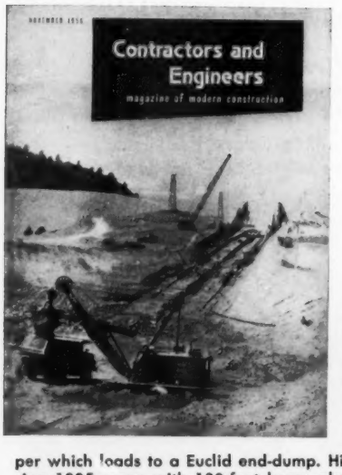
The start of service from these heliports marks a significant step in the development of transportation in the United States. Time saved by flying is often lost in the long, tedious motor trips between the heart of a city and the airport. The trip between Manhattan and Idlewild in New York City's Borough of Queens, for instance, takes well over an hour. With the new helicopter service, the trip between the Port Authority heliport and Idlewild takes only 15 minutes.

The impact of the helicopter on other means of transportation is slight at present, but this is no indication that such will always be the case. The impact of the "horseless carriage" was once slight on railroads, yet today, trucks, busses, and passenger automobiles have taken huge chunks of revenue away from the railroad. When the new highway program gets into high gear, the problem faced by the rail lines will be more acute. Some of the country's great railroad systems are moving to sell various stations, many of them in major cities. Heavy taxes, loss of passenger revenue, and high maintenance costs are responsible for the trend.

The long-range effect of the helicopter on the railroad and the automobile is still uncertain, but indications are that it will help alleviate some of the problems of road transportation. Motor vehicle registrations total approximately 62,275,000 this year, according to the Bureau of Public Roads, an increase of about four per cent over 1955. By 1965, registrations are expected to reach 81 million. More cars—and larger cars—are complicating the problem of designing and maintaining adequate roads. The new 1957 automobiles are longer and wider than ever, many measuring 20 feet from bumper to bumper. Even in the so-called low-price class, one model exceeds 19 feet in length. Another, in the medium price range, has had 3 inches added to its width. If the trend to wider cars is not checked, wider pavement lanes on highways and bridges will be needed to offer a modicum of safety to drivers in this age of high-speed travel. The 12-foot traffic lane might even become as obsolete as the two lane 16 and 18-foot pavements of a generation ago.

Thus, with traffic posing a continual problem to the engineer, such new developments as the commercial heliport are welcome. Right now the helicopter is of limited importance in the field of transportation, but already Port of New York Authority officials are planning more heliports, and their forecast is that passengers entering and leaving Manhattan by helicopter will total about two million a year by 1960, and about three million by 1965. Besides linking New York City airports with each other and downtown centers, helicopters will be used, according to the results of recent studies, to link cities from 40 to 175 miles apart and to link city centers and the suburbs.

Unlike our present sprawling airports, which have to be located outside cities, heliports can be built economically and quickly in small areas. The two touchdown pads at the new Manhattan heliport measure only 80×80 feet. Our American contractors may soon be building more and more heliports like these for the growing flocks of whirly birds.



Blasted rock is excavated for the stilling basin of Glendo Dam, Wyo., by a Bucyrus-Erie 54-B shovel with an Esco 2½-yard dipper which loads to a Euclid end-dump. High above, a Koehring 1005 crane with 100-foot boom places initial concrete for the spillway with a Gar-Bro 2-yard bucket. *Page 6*

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Scow takes one minute to dump 1,500-yard load

Powerful hydraulic cylinders, located alongside each of the six 250-cubic-yard hoppers, operate dump doors simultaneously. They are operated from the control room by one man.

Appropriately named the Sea King, a 171×43×16-foot all-steel dump scow, with a new type of hull to decrease towing resistance, has taken its place in the fleet of scows owned by Henry Du Bois' Sons Co., Inc., a New York, N. Y., dredging firm.

In building the scow at its Port Deposit, Md., yard, Wiley Mfg. Co. made continuous tests to correct any excessive yaw. Modifications of the hull, primarily at the stern, have reduced yaw and drag to a minimum and increased directional stability, making the Sea King highly maneuverable and economical to operate. Hull tests, conducted at the experimental towing tank laboratory of Stevens Institute of Technology in New Jersey, show the Sea King to have a reduced tow rope pull as compared to dump scows. Skegs have also been eliminated.

Big hoppers

The Sea King has six hoppers, each with a capacity of 250 cubic yards, that give the scow a total payload of 1,500 yards. This load—equal to a pile of rock 60 feet long, 30 feet wide, and more than 20 feet high—can be dumped by the scow in one minute.

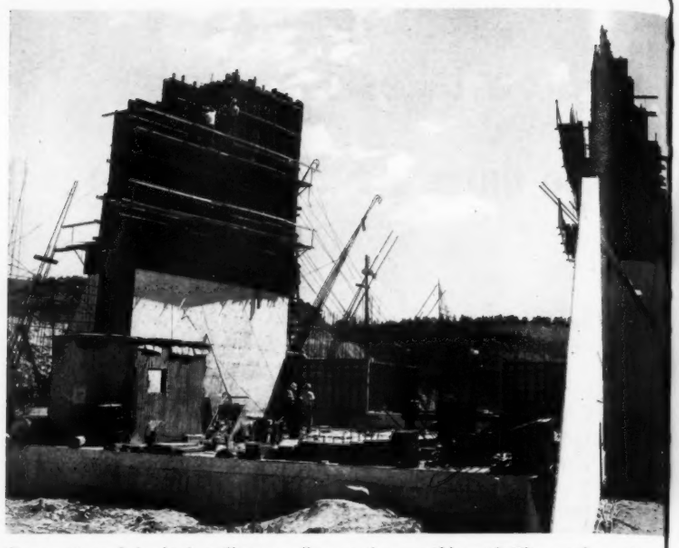
One man, located in the control room where an observation window gives him a complete view of the dumping, can operate the twelve doors of the six hoppers simultaneously or individually. The doors are opened by hydraulic cylinders, with a 10-inch bore and a 66-inch stroke, that are operated by a hydraulic pump driven by a gasoline engine. The cylinders are locked hydraulically for simultaneous operation, but they can be unlatched by a hand hydraulic pump so that loads can be dumped even in case of power failure. Operating chains are 1⅜-inch drop-forged anchor chain, and door cables are 1¾-inch improved plow steel.

Hopper doors, each weighing about 5½ tons, are designed so that rock or debris cannot jam them. The light draft of the scow is about 3¾ feet and the clear dumping width is 9 feet. When hopper doors are closed, their tops are 3 feet above the bottom of the scow. The doors extend 2 feet 6 inches below the bottom of the barge in the open position. Each door has 12-inch-thick timbers of seasoned oak that withstand pounding, cushion shock, and remain buoyant.

The all-welded barge has hopper sides of ¾-inch steel plate. Steel is ¾-inch for the hull side plates, ½-inch for the deck plates, ⅜-inch for the bottom, and ½-inch for the rake bottom. In addition to the cabin, which is insulated, the Sea King has single sleeping quarters.

The Sea King is a sister ship to the Sea Queen, which was the first scow of its type to join the Du Bois' fleet of two dredges, three tugboats, and 16 dump scows. All these rigs are serviced in the company's shipyard in Staten Island, N. Y. THE END

Concrete is placed in the steep sloping section of the spillway by a Koehring 1005 crane with a Gar-Bro 2-yard laydown bucket, while excavation continues in the stilling basin below.



Construction of the high spillway walls was done swiftly with Efco steel panels, which were erected and fastened together in the field by only a few men. Elsewhere, conventional plywood-faced, prefabricated, or job-built forming was used.

Concrete placement is small but complicated on Glendo Dam

Total of 50,000 cubic yards of reinforced concrete placed in small pours; earth-fill job moves into high gear after diversion of North Platte River

by RAY DAY

A relatively small amount of concrete—50,000 cubic yards—went into Glendo Dam on the North Platte River near Glendo, Wyo., to construct the diversion power tunnel, outlet works, spillway, powerhouse substructure, 300-foot pressure conduit, 90-foot-high morning-glory-type power inlet, and main gate shaft.

This reinforced-concrete work, and placement of 2,763,000 cubic yards of earth fill for the dam, are included under the $6,250,000 U. S. Bureau of Reclamation contract held by C. F. Lytel Co., Sioux City, Iowa, and Green Construction Co., Des Moines.

One of the few irrigation-power structures which the USBR has under contract this year, the project was started late in 1954; diversion of the river was effected June 30 of this year, and excavation of the dam embankment core trench was completed July 14. Embankment operations now are concentrated on drilling and grouting bedrock in the lower elevations of the core trench and establishing drains preparatory to backfill operations.

Working just below the outlet structure, a Koehring 605 dragline loads a Euclid with material from the lower cofferdam. All miscellaneous excavation near the powerhouse and outlet works is being handled by this machine.

The sizing and washing unit that turns out aggregates for the concrete is located near the river. The Noble 154-ton remodeled batching and mixing plant produces the 50,000 cubic yards of concrete required in the dam structures.

(Additional photo on front cover)

With diversion completed, earthwork is getting into high gear for the dam. The earth-fill barrier will choke off the North Platte River at a point 4½ miles east of Glendo, where the river makes a horseshoe bend. At this unusual site, Glendo Dam will reach a maximum height of 170 feet above the stream bed and stretch 2,200 feet across the river valley. The dam will have a crest width of 35 feet, a maximum base width of 1,100 feet, and a 45-foot-wide spillway with a capacity of 10,325 cfs. The facility will have a reservoir with a maximum storage capacity of 800,000 acre-feet, of which 275,000 acre-feet is allocated for flood control, 100,000 acre-feet for irrigation storage, and 310,000 acre-feet for power storage. The remaining 115,000 acre-feet of water will be used to cover water rights on the river. When the structure is ready for operation in March, 1958, it will have a pair of 13,333 kva generators, each driven by 16,750-hp turbines at 180 rpm through a 100-foot pressure head, and three 12-foot-diameter outlets that will permit used water to re-enter the river.

Because of its location on a bend of the river, the outlet works-hydroelectric power tunnel was drilled through 2,100 feet of sandstone formation in the narrow neck of the horseshoe. The powerhouse is located on the bend, almost opposite the main dam, and a steel surge tank 22 feet in diameter and 206 feet high rises near the powerhouse.

Small concrete pours

In preparing for the small concrete pours for the dam, the contractor brought in an aggregate and sand production unit, which had been used by Wunderlich Contracting Co., Omaha, Nebr, on Tiber Dam in Montana. Set up with this sizing and washing unit near the dam site was a Noble 154-ton remodeled batcher, which weighed out the correct concrete mix, and a Smith 2-yard tilting mixer. Four Ford F8 trucks with Dumpcrete bodies hauled the material between the plant and the point of placement.

Heavy concrete placement in structures like the spillway and outlet works was handled by a Koehring Model 1005 crane with a 100-foot boom. This crane used a 2-yard Blaw-Knox air-controlled transfer bucket and a Gar-Bro 2-yard laydown bucket on various pours, the latter being used to good advantage on footings and invert slabs on the spillway.

Although many of the pours had to be made with conventional plywood-faced, prefabricated, or field-built forming, Efco steel panels, supplied by Economy Forms Corp., were used to speed construction of the high spillway walls. These panels, erected and fastened together in the field, were used in various sizes and only a few men were needed to form many of the spillway wall pours.

Once the forms were set, concrete placement was conventional, the Koehring 1005 using either the laydown or air-dumped bucket to place the material. Concrete was consol-

(*Concluded on next page*)

A Marion 111-M dragline, using a Hendrix 5½-yard perforated bucket to load a Euclid end-dump with material, excavates a channel for the diversion of the river. The rig is now being used to load out gravel for the earth-fill structure.

(Continued from preceding page)

idated by Dart vibrators, and all curing was done with Hunt Process Clear white-pigmented membrane.

The most difficult concrete problem was encountered in lining the outlet tunnels. Drilled through a soft, fractured rock formation, they were designed with a very heavy steel reinforcing and this made it difficult to place concrete at a good rate of speed. A Rex single Pumpcrete machine was used to start this job, but the contractor soon switched to the use of a Rex 200 double Pumpcrete to speed the operation.

Dirt work moves to peak

At present, a dragline and scraper dirt-moving fleet is working on the earth-fill portion of the dam, which will have 1,320,000 cubic yards of Zone 1 impervious material forming a core; 1,307,000 cubic yards of Zone 2 pervious material upstream and downstream; and 136,000 cubic yards of Zone 3 miscellaneous material buried in a triangular section inside the Zone 2 yardage on the downstream face of the dam. A cutoff trench and a pressure grouting system under the structure will prevent seepage under the fill.

Most of the gravel material for Zone 2 is being excavated by a Marion 111-M dragline, with a Hendrix 5½-cubic-yard perforated bucket, that handled practically all the excavation for the diversion trench. This machine will use an Esco 3½-cubic-yard rock bucket in digging harder material. A Bucyrus-Erie 54-B shovel with an Esco 2½-cubic-yard dipper is being used to excavate blasted rock in the spillway and in the stilling basin area. Miscellaneous excavation near the powerhouse and outlet works area is being done by a Koehring 605 dragline, which will also be used later in loading Zone 2 material.

Hauling units working during this phase of the job include 14 Euclid Model 36-TD's of 22-ton capacity, and eight 13-yard bottom-dump Euclids. In addition, there are 14 Euclid single-power scrapers which are push-loaded in the borrow pit by Allis-Chalmers HD-20's working in tandem. These rigs are making an average haul of 1½ miles from pit to fill. Miscellaneous fill service and bulldozer work is being handled by a fleet of 13 Caterpillar D8 tractors. Auxiliary fill equipment includes four Gebhard sheepsfoot rollers, three McCoy manipulator bars, and two Rome disks.

These units are handling more yardage than would ordinarily be the case, largely because the impervious material in the borrow pit is being pre-watered. Deep-well turbine Worthington pumps, 10 and 6-inch quick-coupling pipe, and No. 70 Rainbird sprinkler heads make up the watering system that is getting an optimum amount of moisture in the fill material so that heaping loads can be boiled up in the scrapers. This system uses river water, which is raised about 75 feet between the stream and the borrow pit by 6,000 feet of pipeline.

Much of the success of work to date on Glendo Dam has been due to cooperation between the USBR and all the construction forces on the job. Lytle and Greene have subcontracted various portions of the work to a number of companies. Among them are: Empire Drilling Co., on drilling and grouting; O. E. Salyer on placement of reinforcing steel; Wiscom & Helzer on painting and enameling; Commonwealth Electric Co. on electrical work; C & D Welding Co. on penstocks, surge tanks, and outlet pipes; Gates & Fox on tunnel construction; and Vernon Miller on cement hauling between Laramie and the dam site.

Personnel

Assisting project manager J. E. Dunn in field supervision are Jim Brodt, project engineer; Guy Strother, concrete superintendent; E. D. Ledwell, carpenter superintendent; Charles Foreman and Jim Brown, excavation superintendents; John Ellison, master mechanic; Roy Thies, office manager; and R. D. Smith, office engineer.

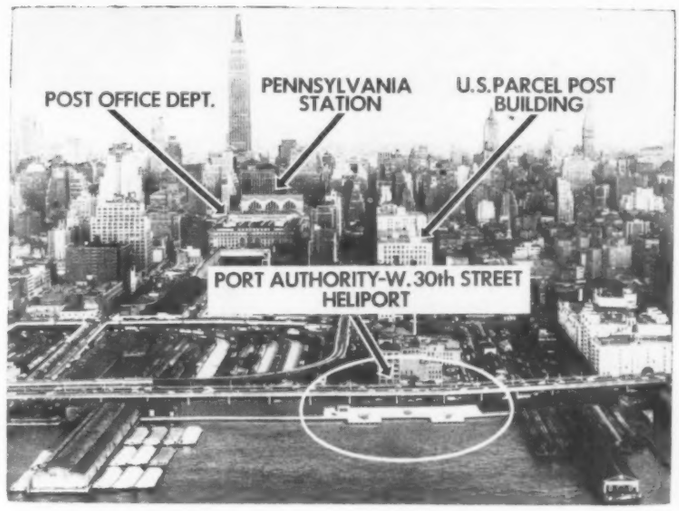
Bureau of Reclamation operations are being supervised by C. S. Rippon, construction engineer; Joe Monserud, field engineer; and Clint Matheny, chief inspector. THE END

Consulting firm increases scope of services

Lockwood, Kessler & Bartlett, Inc., Syosset, N. Y., consulting engineers offering centralized services for civil engineering projects, has increased its seismic subsurface investigation activities for contractors.

In this type of investigation, the depth of earth over rock is determined by measuring the velocity of an induced shock wave through the earth. The wave, set off by a light explosive charge, is picked up and transmitted to a seismograph, which records the time interval between waves and allows the depth of rock to be computed mathematically. The closer the rock is to the surface, the shorter will be the time between the shock waves. The interval will be long when rock lies at a great depth.

Noel M. Ravneberg, who formerly specialized in field seismic surveys for the New York State Department of Public Works, has joined the organization as an engineering geologist and will be in charge of seismic subsurface investigation.



NEW YORK CITY'S FIRST COMMERCIAL HELIPORT is providing mail service from La Guardia airport in New York to Newark airport in New Jersey. The $320,000 facility, opened at the end of September, was constructed by George W. Rogers Construction Corp., New York, N. Y. Located at West 30th Street, the heliport measures 70×400 feet along the Hudson River bulkhead, and has a water area between the existing bulkhead and the United States Line pierhead, which is about 500 feet offshore at that point. The heliport has two 80×80-foot concrete-reinforced touchdown pads, projecting 40 feet out from the bulkhead, that are supported on steel H-piles. The 50×50-foot helicopter area is located between the touchdown pads. A 20×40-foot terminal building is at the northern end of the facility. Protective fence, 10 feet high, surrounds the heliport, and a screening fence is on the westerly side of the West Side Highway.

B. D. Tallamy to head national road project

President Eisenhower has named Bertram D. Tallamy to head the nation's $33 billion highway construction program. Tallamy, chairman of the New York State Thruway Authority, will take charge as Federal Highway Administrator early next year. His appointment is subject to Senate confirmation.

In the meantime, the President has appointed John A. Volpe to the post until Tallamy takes over.

Tallamy, a graduate of Rensselaer Polytechnic Institute, has served as chief engineer of the Niagara Frontier Planning Board. In 1945 he became deputy superintendent of the New York State Department of Public Works. Two years later he was made chief engineer, and in 1948 was promoted to superintendent. He was appointed to his current post when it was created in 1950.

Measurement, testing covered in new text

"Engineering Inspection, Measurement and Testing", by H. C. Town and R. Colebourne, is designed as a supplement for students taking courses in metrology, and for engineers engaged in precision measurement and inspection.

The function of the modern factory-inspection department is explained, and the development of recognized standards and methods of measurement are traced. Later chapters cover the principles and practice of precision measurement. Automatic sizing operations, screw-thread measurement, and the measurement of surface finish conclude the book.

The text, well-illustrated with charts, diagrams, pictures, and formulas, is priced at $8.75, and may be obtained from the publisher, the Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y.

Appropriately enough, the world's largest stainless steel skyscraper, the 45-story Socony Mobil Building in New York City, has a "cornersteel" instead of a cornerstone. The dedicatory outer plaque contains a steel time capsule.

Gravity wall, poured around pier, makes no tie to old structure

A section of the wall form, developed by Blaw-Knox, is moved toward the pier by a barge-mounted crane. The wall being formed is 49½ feet high, 27 feet wide at the bottom, and 8 feet wide at the top.

Constructing a 55-foot high gravity wall 5,500-feet around a U. S. Army Base pier in Boston, Mass., then cantilevering a pier deck 27 feet out over the harbor does not sound like an unusual or even difficult job. But if forms have to be set and concrete placed without any physical tie being made to the old seawall, the job takes on a different aspect.

Since the new construction could not tie into the existing pier, which had been weakened by the nibbling of sea worms and the corrosive action of the salt water, Merritt-Chapman & Scott Corp., New York City, called on Blaw-Knox Co. engineers for help in designing forms for the tricky concrete work.

The gravity wall form being used is 94½ feet long, made of two 34-foot 2-inch panels and a 26-foot 2-inch panel. The entire unit weighs more than 100 tons. Conforming to the contour of the gravity wall, the forms are roughly triangular in shape and have skin plates attached to the long leg of the triangle. The gravity wall formed is 49½ feet high, 27 feet wide at the bottom, and 8 feet wide at the top. Bulkheads held in place by triangular-shaped trusses complete the side forming. Sheet piling placed in 1935 to save the old pier serves as the back face form.

Placing forms

Demolition of the old fender system on the pier makes it possible to dredge a firm bottom for the forms below a depth of 65 feet. This will put the gravity wall deep enough so that it will be serviceable when the channel is deepened under a future harbor development program. Cranes using clamshell buckets then put down the 2-foot blanket of sand that supports the gravity wall.

This done, a series of 14-inch H-piles are driven through the sand blanket to provide an anchor for the gravity wall. In each group of three piles, one is plumb and two are driven on a batter. The upper 5 feet of each pile is left exposed to provide an anchor for the wall. Whenever rock is encountered, holes are either drilled for the piles or keyways are cut longitudinally in the rock ledge.

A template on the leading edge of the old pier makes it possible to place forms to correct line and grade, and a strongback on the forms themselves makes it possible to place them in the water at the right batter. When a form has been placed, eleven 30-inch soldier beam piles are slid through slotted guides on the outer edge of the forms, then driven 15 feet into the harbor floor. These soldier piles are tied back to cantilevered piles, driven

Wall, built with special 94½-foot forms, is anchored by piles; deck forms, held by wall, cantilever pier 27 feet over the water

After tremie and dry pours have completed the concrete gravity wall, B-K forms made of A-shaped trusses are mounted in a precast slot in the outer side of the gravity wall. They are pulled into alignment by anchor bolts.

through holes in the deck of the existing structure, so that no loading is placed on the old seawall. The tie is made with 2½-inch prestressed steel rods and tightened with turnbuckles.

Tremie pours

Three 94½-foot gravity wall forms and enough cantilever deck forms are being used so that nearly 300 feet of wall can be poured at one time, in alternate sections. Sections being poured are separated by a 94½-foot section, the previous pours forming bulkheads. This method of leapfrogging pours is expected to save a considerable amount of time on the project, which calls for the forms to be re-set 60 times.

Each of the 94½-foot sections requires about 2,500 yards of concrete and takes about 25 to 30 hours to tremie. The first pour brings the gravity wall up to the low-water mark. A 7-foot wall section is then placed in the dry. Concrete placed for the cantilevered deck then brings the wall up to deck height.

These cantilever forms, consisting of a number of roughly A-shaped trusses, are mounted to the outer side of the gravity wall. These are held in place at the bottom by a precast slot in the wall, and four anchor bolts cast into the wall pull the trusses into final alignment. The outer and inner bulkheads of the cantilevered section are held in place by a series of beams set at the deck level. All loading is thus transferred to the gravity wall, and no strain is placed on the existing pier. Planking used to deck the trusses remains as a protective sheathing for the concrete.

Personnel

Right now, the contractor is averaging three pours every four weeks. Recently, seven pours were made in four weeks, and the firm is hoping to set an average of two pours each week in the near future.

The entire seawall project, being done under an $8 million contract, includes rehabilitation of the wharf sheds, installation of a new fender system, extension of utilities on the new dock, and installation of gantry and rail tracks.

The New England Division of the U. S. Army Corps of Engineers is supervising the entire project. The consulting firm on the job is Fay, Spofford, & Thorndike, New York, N. Y. Jess Comer is project manager for the contractor; David Kassap is project engineer; Louis Lake, general superintendent; and Gene Hiene, forms superintendent. John Marcato is night superintendent, and Joe Jenkins, carpentry superintendent. THE END

The following article is an excerpt from the book, "Modern Techniques of Excavation", by Herbert L. Nichols, Jr., published this year by North Castle Books, Greenwich, Conn. Mr. Nichols is well known as the author of "Moving the Earth" and "How to Operate Excavation Equipment", excerpts from both of which have appeared in these pages. "Modern Techniques of Excavation", a shortened and revised version of "Moving the Earth", is priced at $9.

Hints on maintenance:

Adjustments

Crawler tracks, whether of the shovel or tractor type, give longest service if kept at correct tension. If too tight, the hinge pins will operate under excessive load, and wear rapidly. If too loose, there will be extra and unnecessary motion in the hinges in the upper section when going forward, and in the bottom when backing against a load. Slack may rub against and wear through final drive cases or other machine parts. Danger of jumping the track is greatly increased.

In general, a track is correctly adjusted if there a slight sag in the top section when the machine is or has been moving forward. If there is an upper support roller, it should be possible to pry the track up from it an inch and a half to two inches. The total sag permitted in a long track is greater than in a short one. A new track may be operated with more slack than an old one that is more likely to come off.

Adjustment on a tractor is made by moving the idler forward to tighten or backward to loosen the track. All the more common arrangements involve a single large bolt threaded into a nut or socket.

Turning the bolt is excessively difficult except on new machines. Dirt works into the threads and cements the pieces together. The hexagon grip is usually difficult to get at, and the wrench that comes with the tractor is likely to be both a poor fit and poor steel. It may not allow a long enough arc of turn, so that an additional wrench with a different handle angle is required. A good quality wrench is often a sound investment anyhow.

A heavy pipe is used to extend the handle to obtain leverage.

Some manufacturers enclose the adjustment in a case or seal it against entrance of dirt, so that the thread can be kept clean and oiled. Tracks so equipped are almost always easy to adjust.

It is good practice to anticipate the time of track adjustment for a few days, and apply penetrating oil and perhaps some "rust-buster" liquid ahead of time. These fluids also help at the time of adjustment. Heating the nut or socket with a torch will usually crack the dirt bond and permit turning.

Shovel tracks are usually adjustable at both ends, and each adjustment uses a pair of bolts, one on each side of the wheel. The idler is moved to adjust the track only, the bull wheel to adjust both the track and the drive chain. Nuts are usually lugged, and the special wrenches are better than those that come with tractors.

Care must be taken that both sides of a shovel wheel are adjusted equally, as, if the wheel is cocked sideward, it will tend to climb out of the track.

Extreme difficulties are encountered with stuck adjustments. It is good practice to wrap all exposed thread in rags, and keep them well oiled. Sometimes packing with stiff water

pump grease will keep them in usable condition.

Track wear

Shovel tracks get considerable wear when the machine is standing still, as the machine tends to move back and forth on them as it digs. Keeping the chains to the rear on a dipper shovel and to the front on a hoe and a dragline minimizes this damage.

Tractor tracks take their worst beating in sharp silica sand and in deep sandy mud. High speed also increases wear out of proportion to the extra distance covered. Such damage can seldom be avoided, but it should be considered when pricing a job.

Track chain life can usually be lengthened by turning pins and bushings 180 degrees before the bushings wear through, or by building up the worn parts of bushings with medium hard steel.

Both track rails and rollers tend to wear more on their outer than their inner edges, eventually producing a slope that encourages the track to run off at the slightest excuse. In this situation building up or replacing either the track or the rollers gives only a doubtful temporary cure. For a thorough repair, tracks, rollers, and idlers must be fixed all at once.

Shovel dozers, and usually bulldozers also, are equipped with roller guards. These are plates extending from the track frame down almost to the track shoes, and serve to keep dirt and stones from sliding onto the track during turns. They should be replaced as part of a track and roller overhaul, as they give valuable protection which diminishes as they wear down.

In most machines, a mechanical clutch or brake should not drag when released, and should not slip when engaged. Exceptions are cushion clutches which will slip a certain distance under a shock load before reestablishing a solid connection, and safety clutches which will slip rather than transmit enough strain to break

parts. These units save damage to machinery and cables from sudden increase of load or from hitting obstacles.

Friction clutches on excavators and cranes are sometimes adjusted so that they will not carry the full engine power to the load, either to cushion shocks, to prevent overloading of the boom or cables, or as a safety precaution against picking up a tipping load. Except in light work, this is likely to result in excessive slippage, heating, and wear. In addition, it usually requires too-frequent adjustments, to keep on the hair line between dangerous slippage and solid engagement.

Brakes which have increased leverage as the pedal nears the bottom of its range are sometimes left loose to reduce the effort of applying. This is a dangerous practice, as heating of an external brake, or reduced friction between lining and drum from seepage of lubricant, or other causes, may cause a complete failure to hold with the pedal down to the floor, which would not occur if a higher pedal position permitted further movement.

Some clutches and brakes will chatter under certain circumstances, often when only partially engaged. This nuisance is usually caused by defective design, but it may be caused or aggravated by gummy linings, out-of-round drums, and wrong hook-up or looseness in the linkage. The condition should be corrected if possible, as it is fatiguing to the operator, makes delicate crane or grading work difficult or impossible, and causes or hastens crystallization and failure of shafts, cases, and clutch parts.

It often happens that a machine has clutches and brakes which work easily and smoothly when new, but which gradually degenerate so as to require excessive effort. Relining, turning down of drums, or routine overhaul may fail to restore their efficiency. In such cases, the trouble may be in some adjustment which is repeatedly made wrong. More often, it is lost motion in the linkage. A tiny looseness at each clevis and pin, inside the clutch, in its connections with the pedal or lever, and weakening of arms so that they twist may be sufficient to destroy the delicate balance which is necessary for proper functioning. Complete rebuilding or replacement of the linkage may restore efficiency, at less expense than frequent stops for adjustments, and shutdowns for relining.

A dry clutch or brake should be kept free of oil and grease. If any accidentally gets on the lining, it can usually be washed off with naphtha (this is preferred to leaded gasoline because it is less likely to leave a deposit). However, the grease may soak in so far that it will take repeated washings, alternating with sufficient use to heat it up.

After grease soaking, or from other causes, a lining may acquire a hard or gummy surface which persists in spite of cleaning. Sprinkling with fullers' earth, a finely powdered clay which can be obtained in drug stores, will often restore effectiveness temporarily and repeated applications may keep the lining usable until it wears out. It is most conveniently applied with a rubber bulb syringe, another drug store item.

Pounds pressure or pull required to release a properly adjusted clutch is often specified in instruction books, but measuring this resistance is difficult in the field or the average shop. Fortunately, exact compliance with these directions is not vital. Pull can be estimated, but the important thing is that the clutch should not slip under the operating conditions prevailing. If it does slip, it should be adjusted immediately, deadlined, or at least demoted to lighter or slower duty until adjustment is possible.

If there is no further adjustment in either the clutch or linkage, lining or plate(s), the clutch friction parts should be replaced immediately, as unnecessary and expensive damage may otherwise be done to pressure plates and other parts.

A test for slippage is made by slow engagement of the clutch under heavy load in high gear.

Backlash

Backlash (play in a drive line) in splines, a jaw clutch, between the teeth of meshing gears, or between a sprocket and a roller chain, can be both annoying and destructive. If in a shaft it can be eliminated by repairing or replacing worn universals, tightening flange bolts, and building up or replacing jaw clutch teeth. Gears can be moved into closer adjustment, or replaced. If large and crude, teeth may be built up. In

sprocket chain combinations, the chain frequently needs replacement, but it is good practice to repair or replace the sprocket at the same time, to avoid too-rapid wear on the new chain.

Such work will increase efficiency, and cut down breakage costs.

Excessive twist of frame members in service causes crystallization and fatigue in the metal that may result in early breakage. The amount of stress in a heavy piece of steel can be determined by smearing it with mud, subjecting it to load when it is half dry, and watching the cracks.

Experience with a particular model or type of machine often indicates the need of reinforcement before placing it in service. The average bucket lip or tooth has a much longer life if it is weld-surfaced with a hard rod before it is used, and if the surfacing is renewed before wear gets into the softer metal beneath.

Dump truck frames are often reinforced by fishplating. The point of greatest stress is between the body and the cab. The usual flat reinforcing fishplate may not be satisfactory because it reinforces against vertical stresses only, and twist is an important factor in failure of frame members. Use of angles or channels produces better results. A channel inserted and welded in the frame channel is the preferred method. Fishplating should extend along at least two feet of frame, preferably three or more, and should be securely welded top and bottom. Bolting or riveting weakens both the frame and the plate.

The rear cross members may require strengthening also. Any type of fishplating, or welding a heavy pipe between the frame members immediately ahead of it, should give sufficient support.

Reinforcement is most easily installed before the body is mounted, and most effective before the frame has been strained by carrying heavy loads.

Cable (wire rope)

Cable, or wire rope, is one of the most important materials or parts used in excavation machinery. There are many types for different uses, but most of them are made up of carbon steel wires wound with each other to make cable. The strands are wound around a center or core, which may be an additional strand, a miniature cable, or a rope made of sisal or manila. The wire core is stronger and more resistant to crushing, but is less flexible than the hemp.

A cable is designated by its size, by the grade of steel wire used in it, as to whether it is preformed, by its lay, the number of strands not including the core, and the number of wires in each strand.

A widely used construction is the 6×19—that is, six strands of nineteen wires each. The wires may be all of one size, or of two or more sizes. Additional wires, to a total of 25 per strand, may be added without changing the 6×19 designation. Each construction has a name, often the name of the designer of the particular type. Variations in flexibility and in resistance to crushing and to abrasion are obtained. Small wires are desirable when the cable is subjected to sharp bending; large outer wires when it may be rubbed and chafed.

The lay of a wire rope is the direction of twist of the wires in the strands and the strands in the cable. The right and left designations indicate the direction the strand takes in crossing the top of the cable as it winds away from the observer. In regular lay the wires in the strands are twisted in the opposite direction from the strands in the cable. In Lang lay the wires and the strands both have the same twist. In practice, the difference is that the Lang lay has better fatigue resistance because of the flatter exposure of the wire, but it has a tendency to untwist unless both ends are held.

Under conditions where coarser outer wires are needed to obtain resistance to abrasion, Lang lay may be used in order to regain some of the bending fatigue resistance lost by using the thicker wire.

In the field, this is commonly interpreted to mean that Lang lay has inherently better abrasion resistance than regular lay, but when the same size outer wires are used, the difference is negligible except under certain special conditions.

Right lay is the usual construction and is recommended for overwinding on a drum when the anchor is on the left, and for underwinding when the anchor is on the right. Left lay is preferable for overwinding from the right, or underwinding from the left. This is because the cable, when relieved from strain, tends to twist slightly as if to unwind its strands, and if used as advised previously, this twisting will cause the wraps on the drum to hug each other, instead of loosening and spreading apart.

To determine whether a drum is overwinding, stand behind it, looking along the outgoing cable. If it takes off from the top or near side of the drum, it is over; if the bottom or far side, under.

Several grades of steel are used in wire rope. The two most suited for excavation machinery are plow steel and improved plow steel. The improved variety is about 15 per cent stronger than the plow steel, which in turn is considerably stronger than the

mild plow and traction steels used in elevator cable, stationary guy ropes, and highway guards.

Cable wire is stiff and springy. In ordinary non-preformed construction, if a wire is cut or broken the ends will straighten and project from the rope surface at an angle. These ends cause extra wear to sheaves, drums, and other wraps of cable, and will cut unprotected hands.

If such a cable is cut or broken, the wires and strands will untwist for several feet or yards on each side, unless bound (seized) or clamped.

Preformed cable is made of wires which are shaped so that they lie naturally in their positions in the strand and the rope. They show little tendency to stand out from the surface or to unravel when cut.

Preformed cable is safer to handle than the straight wire type and is more resistant to fatigue caused by working over small sheaves, or around sharp angles. It is recommended for use in most excavating machines, and is replacing the older type.

Wire rope is manufactured in long pieces that are cut into shipping or working lengths by the manufacturer, dealer, or user.

Cable formed from straight wire should be firmly bound (seized) with soft iron wire in two to four places on each side, before cutting. A tighter wrap can be obtained by holding the loose end of the wire under some tension and twisting it onto the rope with bar.

Large cables require more and tighter seizing than small ones.

Seizing wire should be thin enough so that the cable end will go through a socket or clamp easily. If difficulty is experienced, the cable and binding can be flattened with a heavy hammer.

Preformed cable is usually bound only when it is to be placed in a poured socket, or is to be stored or roughly handled before use.

Fittings and anchors

In general, cable ends require some sort of clamp or fitting to attach them to the power source or work.

The connection between the wire rope and the fitting may be secured by clamps, wedges, or fillers.

The standard clip, or cable clamp, consists of a U-bolt, a saddle, and two nuts. The cable is doubled over on itself, and the two thicknesses squeezed between the U and the saddle by tightening nuts. The grooved inner surface of the saddle has a better grip than the U, and is therefore used on the live or working end of the rope.

There are also heavy-duty types of clip that use two identical saddles with rough inside surfaces, and can be put on from either side.

Two or more clips are used, the number increasing with the diameter of the cable. They afford a good grip, but are tedious to install and remove and occupy too much space for some uses.

The wedge socket jams the cable in too-small grooves in the outer surface of the wedge and in the inner surface of the socket.

The cable is wrapped around the wedge which is tapped into the socket. Pull on the cable pulls the wedge farther, tightening the connection.

This device is best suited to excavator and other cables whose ends are more or less fixed, and which have to be removed at intervals. It is too bulky for many applications.

A poured (filled) fitting consists of a conical socket attached to an eye, loop, hook, or other device. It is installed by putting the end of the rope through the small end of the socket, fraying it out like a brush, removing the help center, if any, and lubricant or other foreign matter. Molten zinc is poured in the socket. It hardens, holding the individual wires in their expanded position so that they cannot be pulled through the small end.

Babbit and lead are too soft for use in these fittings unless the load is to be extremely light.

Broken chains can be repaired by hot forging of new links or by using special repair or connecting links.

Such links are purchased, assembled, and separated by driving a chisel or a very sharp screwdriver between the pieces. This is most conveniently done in the shop.

If the links to be connected have pulled out of shape it may be possible to get the repair pieces through them. Such a link can be opened up by placing it on a block with a hole in it, and driving a big punch through it.

A good repair link is somewhat stronger than a standard chain link.

(To be continued next month)

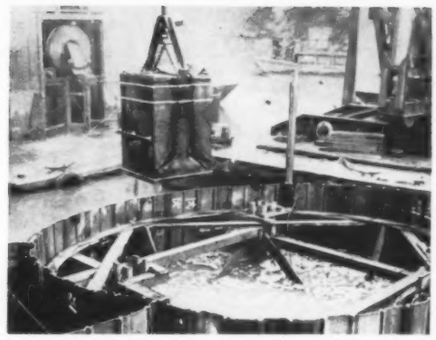
West Coast operation started by American Hoist

A totally owned new corporation of American Hoist & Derrick Co., St. Paul, Minn., has been opened in Seattle, Wash. Known as American Hoist Pacific Co., the firm will produce custom - engineered heavy - material-handling equipment.

Charles D. Gould is vice president and general manager of the firm.

A barge-mounted derrick positions one of the 29-foot-diameter templates.

The submarine bucket dumps lean concrete through the wooden template.



Permanent cofferdam protects plant's water supply

A permanent cofferdam, consisting of seven 29-foot-diameter cells, is now safeguarding the water supply for the industrial operations of the American Viscose Corp. The dam, located in the navigable Little Kanawha River in Parkersburg, W. Va., is not far from Dam No. 1. That dam was built in 1890, but as funds to maintain it have not been authorized for many years, it had been abandoned by the U. S. Army Corps of Engineers.

However, the American Viscose Corp. needed the dam to provide water for its rayon plant. When it became obvious that major repair work on the original timber-crib structure was necessary, engineers from American Viscose made numerous technical and economic investigations. As a result of the studies, it was decided to build a cellular-type dam with interlocking steel sheet pile cylinders filled with lean concrete, and capped with an 18-inch lift of erosion-resistant high-strength concrete.

Since the new dam is located downstream from the old one, Dravo Corp., Pittsburgh, Pa., contractor for American Viscose, used a floating construction plant that included two derrick boats and a concrete mixer boat. These were towed upstream from the Ohio River, as were barges containing all necessary materials.

Position template

The first step in the operation was to position a 29-foot diameter wooden template by derrick boat. This completed, interlocking steel sheet piles were driven around the floating template to form the outer surface of the cell. All succeeding cells were built in the same manner.

After excavating inside the cell to bedrock, a submarine bucket, filled at the mixer boat, placed the concrete up to pool level. After that, a conventional bucket was used. As the level of the concrete rose and water was displaced from the cell, the template was raised and finally removed from the cell.

Located 3½ miles upstream of the Ohio River, the Avisco dam extends 300 feet from an existing concrete lock adjoining Dam No. 1. In the center of the new dam is a 120-foot spillway area, 6½ feet above lower pool level and 2.4 feet lower than the ends of the structure. THE END

Marlow Mud-Hogs work on a deep lift where the sewage line tunnels under a road.

La Fera used this Marlow Mud-Hog to dewater a ditch 25 feet below grade in which an 84 inch sewage pipe is being laid. Constant seepage at this point made it necessary to run the pumps 24-hours a day to keep ahead of the water.

Almost buried in mud, this Marlow Mud-Hog pumps efficiently near the site of the second sewage plant being built for the Jersey City Sewage Authority by the La Fera Contracting Company of Newark, New Jersey.

Marlow Mud-Hogs Solve Major Seepage Problem

Rugged pumping conditions on $30,000,000 sewage project

Garden State Constructors are currently working on a $30,000,000 project to extend sewage facilities from Bayonne to Secaucus, N. J., for the Jersey City Sewage Authority. There are two plants and two main trunk lines feeding these plants that are involved in this job. Work has been under-way for a year and will continue through 1956.

La Fera Contracting Co. of Newark, N. J., one of four contractors united in this joint venture, is handling the west side pipe line construction. They are installing approximately 25,000 feet of 42" to 84" pipe. Cuts run as deep as 30 feet below grade and all are below the Newark Bay sea level.

La Fera selected Marlow Mud-Hogs and used them 24-hours a day with minimum service interruptions and trouble. Frank Grosso, Equipment Superintendent, said, "We use Marlow Mud-Hogs because we found they out-performed all others." Over 15 Marlow Mud-Hogs are being used by La Fera. Other contractors on the same job are using about double this amount.

Because the pumps have performed so effectively, the job has run *ahead* of schedule, despite the constant water problem. Pep Rizzolo, La Fera Master Mechanic, said, "You can't beat Marlow Mud-Hogs for hard pulls involved in deep hole work such as we are doing now."

For a tough dewatering job you can depend on Marlow Mud-Hogs. They take all kinds of abuse and pass trash and debris without clogging. Write today for complete information.

Marlow PUMPS

MARLOW PUMPS
Division of Bell & Gossett Company
RIDGEWOOD, NEW JERSEY
Morton Grove, Illinois Longview, Texas

For more facts, use Reader-Reply Card opposite page 18 and circle No. 212

Convention calendar

November 14–15 National Constructors Association
Executive and Labor Committee Meetings, Chapman Park Hotel, Los Angeles, Calif. C. B. Bronson, secretary-treasurer, NCA, 50 E. 41st St., New York, N. Y.

November 14–16 Virginia Highway Conference
Meeting, Virginia Military Institute, Lexington, Va. R. P. Ellison, executive assistant, VHC, 1221 E. Broad St., Richmond, Va.

November 25–30 American Society of Mechanical Engineers
Annual Meeting, Hotel Statler, New York, N. Y. D. B. MacDougall, ASME, 33 W. 39th St., New York 18, N. Y.

November 26–27 Wire Reinforcement Institute, Inc.
Meeting, The Jung Hotel, New Orleans, La. Frank B. Brown, managing director, WRI, 1049 National Press Bldg., Washington 4, D. C.

November 27–30 American Association of State Highway Officials
Meeting, Traymore Hotel, Atlantic City, N. J. Kenneth Rice, Secretary, AASHO, 1035 Parkway Ave., Trenton, N. J.

December 2–4 Associated General Contractors of America, New York State Chapter, Inc.
Thirty-first Annual Convention and Exhibition, Hotel Statler, Buffalo, N. Y. William M. Lees, managing director, AGCNYSC, De Witt Clinton Hotel, Albany, N. Y.

December 3–5 Fourth Illinois Structural Engineering Conference
Meeting, University of Illinois, Urbana, Ill. R. K. Newton, FISEC, 116 Illini Hall, University of Illinois, Urbana, Ill.

December 6–7 Mississippi Valley Flood Control Association
Meeting, Hotel Roosevelt, New Orleans, La. Al Bourgeois, conventions and advertising manager, MVFCA, Hotel Roosevelt, New Orleans, La.

January 17–19, 1957 Associated General Contractors of Minnesota
Meeting, Hotel Leamington, Minneapolis, Minn. AGCM, 910 Builders Exchange Bldg., Minneapolis 2, Minn.

January 27–30 Associated Equipment Distributors
Thirty-eighth Annual Meeting, Conrad Hilton Hotel, Chicago, Ill. P. D. Hermann, executive secretary, AED, 30 E. Cedar St., Chicago, Ill.

January 28–31 Plant Maintenance and Engineering Show
Exhibit, Public Auditorium, Cleveland, Ohio. Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

January 28–February 2 American Road Builders' Association
Combined Conference and Road Show, International Amphitheatre, Chicago, Ill. Louis W. Prentiss, executive vice president, ARBA, World Center Bldg., Washington, D. C.

January 30–31 Midwest Welding Conference
Third Annual Conference, Chemistry Bldg., Illinois Institute of Technology, Chicago, Ill. Harry Schwartzbart, supervisor of welding research, MWC, Armour Research Foundation, Illinois Institute of Technology, 35 W. 33rd St., Chicago 16, Ill.

January 31–February 2 National Bituminous Concrete Association
Second Annual Convention, Conrad Hilton Hotel, Chicago, Ill. H. K. Griffith, executive director, NBCA, 1145 19th St. N. W., Suite 218, Washington 6, D. C.

During the month of September, the New Jersey Garden State Parkway collected $1,250,000 in tolls, restaurant-gasoline concessions, and other earnings. This is a 20 per cent increase for the same month last year.

For over-the-highway transport, the Be-Ge scraper plane can be telescoped and towed behind a light truck at 40 mph.

Scraper plane designed for precision grading

■ A high-speed scraper plane designed for precision grading in road building and airfield construction is available from the Be-Ge Mfg. Co. The rig is available in 50, 55, and 75-foot leveling lengths for use with both wheel and crawler tractors.

The hydraulically operated Be-Ge scraper can be telescoped and trailed behind a light truck at 40 mph for transport between jobs. According to the manufacturer, the rig's weight is distributed over the entire length of the rigid, trestle-like frame. The scraper will not spring on hard ground or sag when the bucket is full.

A lever action between the scraper plane sections reduces the up and down blade travel. The blade will rise only 1 inch when the front wheels run over a 6-inch rise. No secondary engine is required to operate the hydraulic circuit. All controls are actuated from the tractor seat.

For further information write to the Be-Ge Mfg. Co., P. O. Box B-1, Gilroy, Calif., or use the Request Card at page 18. Circle No. 75.

Butterfly valves

■ "Tentative Standard Specifications for Rubber-Seated Butterfly Valves", a revised pamphlet prepared by the American Water Works Association, is now available from Builders-Providence, Inc. The pamphlet covers cast iron and steel, flange-end, rubber seat, tight-closure valves, 3 to 72 inches in size, for line velocities not exceeding 16 feet per second. Torque requirements for operators are reviewed in another section of the pamphlet. Materials of construction, mechanical components, testing, workmanship, and inspection are in other sections of the pamphlet.

To obtain the pamphlet write to Builders-Providence, Inc., Division of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I., or use the Request Card at page 18. Circle No. 26.

Hose clamps, fittings

■ A condensed information sheet on hose clamps, locking tools, fittings, and accessories is available from the Punch-Lok Co. Also illustrated and described is the Clamp-Master kit consisting of an assortment of 45 clamps and a P-38 Loking tool. Claimed to be useful for repair crews and maintenance trucks and shops, the kit contains clamps for ½ to 10-inch-diameter application.

To obtain Form No. F-279-R2 write to the Punch-Lok Co., 321 N. Justine St., Chicago 7, Ill., or use the Request Card at page 18. Circle No. 58.

Twin Disc Clutch marks 38th anniversary

Celebrating its 38th year in business September 12, Twin Disc Clutch Co., Racine, Wis., dedicated its new Racine plant and presented P. H. Batten, founder and chairman of the firm, with a bronze portrait plaque in recognition of his 38 years of leadership.

The new Racine plant provides Twin Disc with an additional 92,500 square feet of floor space for manufacturing. The firm, maker of clutches, drives, power take-offs, couplings, and allied products, now operates, in addition to manufacturing and testing facilities, seven factory branches and 68 parts stations. The firm recently formed Twin Disc Clutch, AG, as a foreign subsidiary in Vaduz, Liechtenstein.

Automatic calculator does several problems at once

■ A fully-automatic desk calculator that can give the answer to several figuring problems simultaneously is announced by Monroe Calculating Machine Co., Inc. The Monro-Matic duplex calculator adds as it multiplies and adds as it divides.

By automatically storing individual

The Monro-Matic duplex calculator can do several problems simultaneously and can store individual answers for subsequent additions or subtractions to determine the final result.

answers, the Monro-Matic eliminates the time-consuming addition or subtraction of results to determine the final answer. In figuring vertical curves, the machine computes the offset and at the same time checks the station reading.

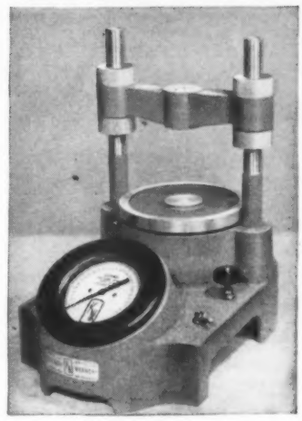
The calculator is recommended for use in solving many engineering problems as well as for computing payroll, cost control, inventory statistics, and similar tasks.

For further information write to Monroe Calculating Machine Co., Inc., 555 Mitchell St., Orange, N. J., or use the Request Card that is bound in at page 18 of this issue. Circle No. 80.

Tester applies loads equivalent to 36 tons

■ Loads equivalent to 36 tons per square foot on a 2½-inch-diameter sample can be applied instantaneously with the Model 352 K-W Conbel portable physical soil testing machine, according to the manufacturer, the Tinius Olsen Testing Machine Co. The tester weighs 40 pounds.

The Model 352 has a capacity of 2,600 pounds at 100 psi with a sensitivity of from ⅓ to ½ per cent of full load. Loads are applied by air pressure through a piston inside a rubber diaphragm, eliminating the need for a spring constant.



The Model 352 K-W Conbel portable physical soil testing machine can instantly apply a load equivalent to 500 psi on a 2½-inch-diameter sample.

To apply the load, the operator opens a toggle valve on the base of the testing machine. The load is then held indefinitely by a precision air regulator and recorded on a sensitive test gage, the manufacturer reports.

For further information write to the Tinius Olsen Testing Machine Co., 5584 Easton Road, Willow Grove, Pa., or use the Request Card at page 18. Circle No. 72.

New final drive seal gives dual protection

■ A final drive bellows seal for Caterpillar tractors which has, in addition to the regular rubber bellows, a neoprene O ring seal inside two metal flanges is announced by the Sure-Seal Equipment Co. The extra seal is said to prevent the lubricant in the final-drive housing from reaching the rubber bellows, giving double protection against the loss of lubrication.

Sure-Seals are available for the final drive of Cat D4, D6, D7, and D8 tractors. For the International TD-24, there is an outer sprocket diaphragm seal available.

The manufacturer also makes roller seals for tractors. The roller's inner seal differs from the final drive seal in that a flat rubber ring with a V-shaped cut is used rather than an O ring. When grease is forced into the roller under high pressure it expands the V of the ring, sealing it tighter. Thus, high-pressure lubrication cannot reach the outer bellows and rupture it, the manufacturer reports.

For further information write to the Sure-Seal Equipment Co., 1820 N. W. 25th Ave., Portland, Oreg., or use the Request Card at page 18. Circle No. 104.

←For more facts, use coupon or circle No. 214

names in the news

Col. Sears Yates Coker, the assistant district engineer of the Eastern Ocean District.

Col. Sears Y. Coker assigned to Eastern Ocean District

Col. Sears Yates Coker has been assigned as assistant district engineer to the Eastern Ocean District of the U. S. Army Corps of Engineers. Col. Coker, a civil engineering graduate of the U. S. Military Academy at West Point, holds a master's degree from the Massachusetts Institute of Technology.

Prior to his present appointment, Col. Coker was stationed at the U. S. Military Academy, West Point, N. Y.

At the same time, Lt. Col. William L. Starnes, Jr., will be the new assistant chief of operations for certain overseas areas for the Eastern Ocean District. Col. Starnes was graduated from the U. S. Military Academy and has a master's degree in civil engineering from the Massachusetts Institute of Technology. He holds professional engineer licenses in the states of New York and Texas.

Brig. Gen David W. Heiman is the new assistant chief of engineers for Military Supply. During World War II, Gen. Heiman served in the Pacific Theater, and after various assignments in the United States, he became assistant commandant of the Engineer School, Fort Belvoir, Va.

The new assistant chief of engineers for personnel is Col. Stephen R. Hanmer. Prior to his new appointment, Col. Hanmer was with the Logistics Division in Europe working on infrastructure programming and execution.

Brig. Gen. Paul D. Berrigan was given a recess appointment by President Eisenhower as a member of the Mississippi River Commission in addition to his other duties as North Central Division engineer for the U. S. Army Corps of Engineers at Chicago, Ill. The appointment is subject to Senate confirmation.

Gen. Berrigan succeeds Col. John L. Person, who was named acting assistant chief of engineers for the Civil Works, Washington, D. C.

Maryland appoints maintenance engineer

Frank P. Scrivener has been assigned the position of state maintenance engineer for the Maryland State Roads Commission. Scrivener, who for 15 years has developed the state's system of prison-labor road projects, will now operate out of Baltimore. There he will work with the seven district engineers.

ASCE installs president, vice presidents, directors

The American Society of Civil Engineers, at their national convention, last month, installed Mason G. Lockwood as president of the society for one year. Mr. Lockwood is a senior partner in the consulting engineering firm of Lockwood, Andrews & Newnam of Houston, Texas.

A past vice president of the society and past president of the Texas Section, Lockwood is a registered engineer in Texas and Louisiana.

Also installed as vice presidents for a two-year term are Francis S. Friel and Norman R. Moore. Newly elected directors serving a three-year term are Randle B. Alexander, E. Leland Durkee, Clinton D. Hanover, Jr., William J. Hedley, Finley B. Laverty, and Howard F. Peckworth.

Mason G. Lockwood, newly elected president of the ASCE.

Md. Roads Commission appoints Lisle E. McCarl

The Maryland State Roads Commission has appointed Lisle E. McCarl district engineer for Montgomery and Prince George's Counties. He will have headquarters at Laurel. He has been assistant district engineer in that area for the past three years, and more recently has been acting district engineer. McCarl supervised construction of the Patuxent River Bridge at Benedict and the Washington National Pike.

McCarl succeeds Roland E. Jones who is now special assistant to Robert

O. Bonnell, the chairman of the Roads Commission.

William F. Childs, Jr., former chief engineer for the Maryland State Roads Commission, has retired. A civil engineering graduate of Cornell University, Childs has been with the Commission for 46 years. At the time of his retirement he held the position of advisory engineer.

Brig. Gen. Talley (ret.) joins Raymond Concrete

Brig. Gen. B. B. Talley, U. S. Army (ret.), has joined the staff of Raymond Concrete Pile Co., New York, N. Y., as project manager. In his new position he will direct construction operations in foreign countries.

Brig. Gen. B. B. Talley, U. S. Army (Ret.), the new project manager for Raymond Concrete Pile Co.

Gen. Talley is a graduate of Georgia School of Technology, Army Engineer School, and the National War College. For the past year he was division engineer, Mediterranean Division, U. S. Army Corps of Engineers, with headquarters in French Morocco. While there he was in charge of construction of Air Force bases in North Africa and the Middle East, and other projects in Pakistan and Iran.

He is a member of the American Society of Civil Engineers, and the Society of American Military Engineers.

Martin, Shumaker organize

Robert J. Martin and Vernon O. Shumaker have organized the firm of Martin & Shumaker. Located at 300 Bridge St., Vestal, N. Y., the firm will specialize in highway, airport, and sanitary engineering. Both men were formerly associated with William H. McFarland.

K. A. Gutschick joins National Lime Assn.

Kenneth A. Gutschick has joined the staff of the National Lime Association as technical service manager.

Kenneth A. Gutschick, the new technical service manager for the National Lime Association.

In his new position he will concentrate on the research, promotion, and publicity of burned lime products in all fields, and will also act as general assistant to Robert S. Boynton, the general manager of the Association.

Asphalt Institute assigns research, district engineers

The Asphalt Institute, College Park, Md., has assigned Fred N. Finn as research engineer on the forthcoming $14-million AASHO Test Road project in Illinois. Finn will have the title of special project engineer during the construction and operation of the asphalt test pavement now being built between LaSalle and Ottawa, Ill. The four-year test, sponsored by the American Association of State Highway Officials, is expected to get under way late next year.

At the same time, the Institute has opened a new district office at Louisville, Ky. This new office is headed by Ellis G. Williams.

Richard L. Mann joins Florida architect firm

Former Navy captain Richard L. Mann has joined the architectural firm of Gamble, Pownall & Gilroy, Fort Lauderdale, Fla., as coordinator of administration and planning. In his new position, Mann will be responsible for the administration of design and plans within the firm's offices.

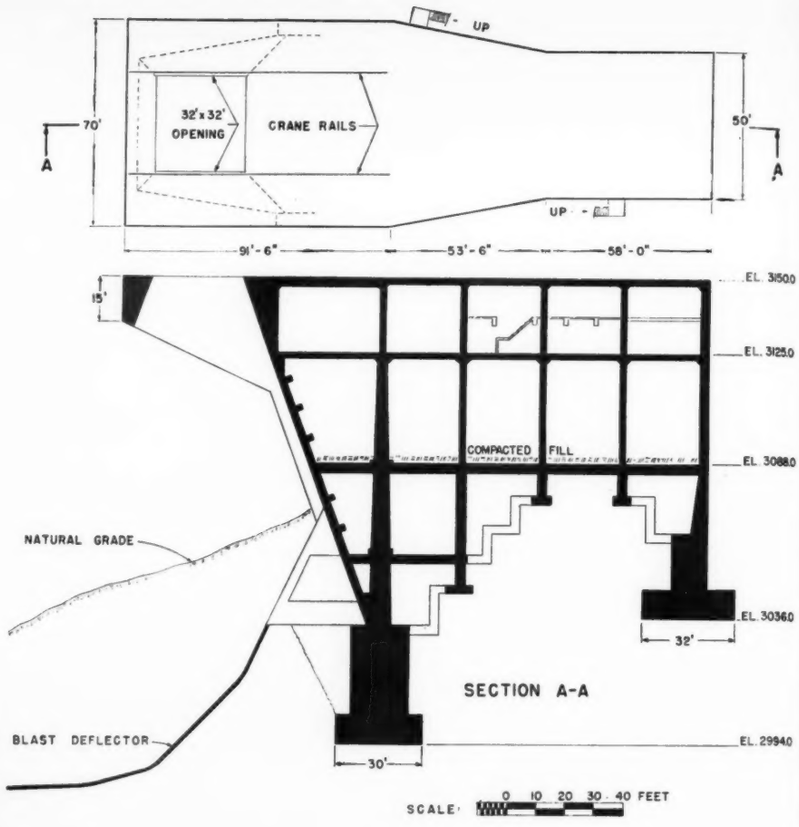
A graduate of the U. S. Naval Academy and Rensselaer Polytechnic Institute, Mann previously served as district civil and public works officer for the 15th Naval District in the Canal Zone.

Pa. Turnpike appoints

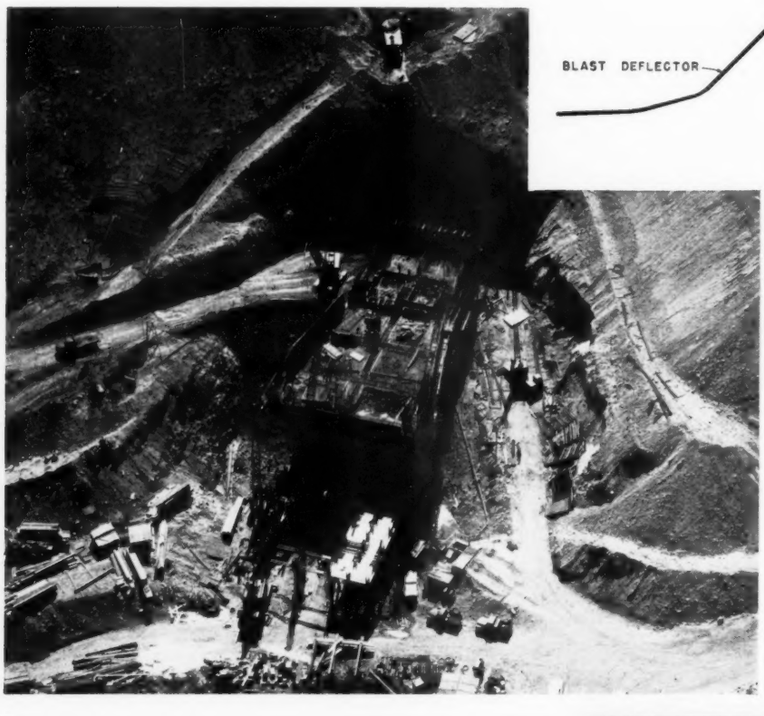
The Pennsylvania Turnpike Commission has appointed Michael Baker, Jr., Inc., of Rochester, Pa., as its new consulting engineer. During World War II, Baker engineers, in conjunction with the U. S. Corps of Engineers, helped to build the nation's military defenses in Alaska, the Aleutians, and the Azores. Since that time, the firm has been primarily working on highway and bridge design, aerial tax-mapping, irrigation, and hydro-electric projects.

Support is biggest problem in building rocket test stand

Timber tower is used while 54-foot cantilever deck section is placed; facility is built to carry dead loads and resist thrust during firing



Section A-A of the test stand shows the massive base construction supporting the stand. The plan view shows the location of the 32-foot-square blast opening in the cantilevered deck and the rails that will be used by the crane that sets a missile in position for firing.

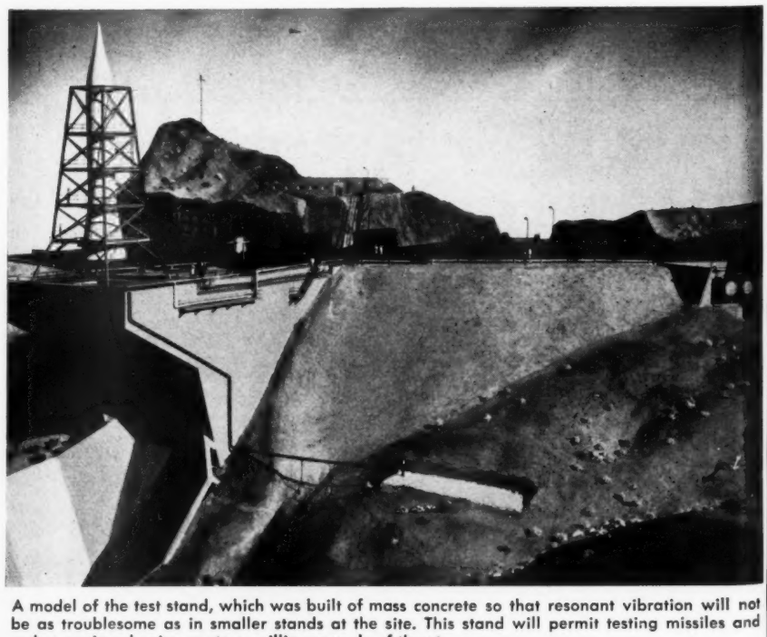


The base of the stand is nearly complete and work has started on the timber tower used to support the 54-foot cantilever arm that juts out 150 feet above the flame-deflection pit.

The largest concrete stand ever designed to test rocket engines and missile components is currently being rushed to completion in the desert wasteland in the eastern section of Edwards Air Force Base, Calif. A reinforced-concrete bridge-type structure, the new stand is anchored 60 feet into solid rock, has an over-all length of 200 feet, and cantilevers 54 feet out over a flame deflector pit that will lead gases from test vehicles away from the stand.

The cantilevered section, 150 feet above the pit, is 15 feet thick at the outer end and 40 feet thick at the haunch. In the cantilevered deck is a 32-foot-square opening through which

Carpenters complete formwork for a section of the base of the stand, which went up in 12-foot lifts. The contractor worked two shifts: the first built the forms and the second placed the concrete.



A model of the test stand, which was built of mass concrete so that resonant vibration will not be as troublesome as in smaller stands at the site. This stand will permit testing missiles and rocket engines having up to a million pounds of thrust.

exhaust gases and flames can be carried to the deflector pit. While test preparations are being made, this opening will be covered by a steel plate.

At an intermediate level below the deck and within the shell of the new stand, special servicing and utility areas—including a machine shop, a terminal room — for data-recording instruments, electrical and mechanical equipment rooms, and office space —are provided. Architectural work on the stand was done by the Ralph M. Parsons Co., Los Angeles.

Until this time, static and rocket engine tests and missile research have been carried on at Edwards on stands permitting the use of missile components of only a half million pounds of thrust. The new stand at the 300,000-acre base, where research and testing of this type have been going on since 1952, will be used for missiles having up to a million pounds of thrust.

Eight miles of desert separate the main part of the base from the testing ground, which has a sufficient amount of rock to form a foundation for the heavy test structures and steep cliffs that give a rough form to the flame-deflector pits required for the stands.

Two types of loads

The new test stand, like smaller ones already in use, will carry two types of loading to bedrock. It must support extremely high dead loads and also provide enough uplift resistance to the million pounds of thrust developed during the static test firing of missile components secured to the stands. The cantilevered section also has to be capable of withstanding a tremendous upward surge of power, generated at the time of firing, that puts the bottom edge of the cantilevered arm in tension.

The cantilever is only a portion of the huge concrete structure provided to counterbalance the two opposing load forces. The stand is based on two massive concrete footings that fit deep into the rock. One, located at the rear of the structure, runs across the transverse axis of the stand. The other, 30 feet wide, 120 feet long, and 20 feet deep, is deeper in the rock, resting 146 feet below the deck of the stand. Both footings are solid mass concrete. Reinforcing was used only on the facing.

Test borings showed an excellent granite at the desired footing depths, but above this was faulty rock that was to provide support for the walls. Originally, this was to be replaced with grouted rock, but a study revealed it would be cheaper to replace the material with lean concrete, and this substitution was approved by Air Force Installations engineers.

More than 26,000 cubic yards of Class A concrete and more than 30 tons of reinforcing steel are going into the structure which is being built by George A. Fuller Co., Los Angeles. The steel work, unique in that many of the rods being handled in one piece measure up to 150 feet in length, is being done under a subcontract by Ryerson Steel, Los Angeles.

At the bottom of the stand, walls are as much as 8 to 10 feet thick. A small portion of this concrete was handled by the crane-and-bucket method, and cranes were used to pour beams and walls, but most of the mass concrete was placed by the Pumpcrete method.

Carbo Construction Co., subcontractor on the concrete work, kept two shifts going to complete all the concreting in a 6-month period. The day shift placed all formwork and the night shift placed the concrete.

The body of the test stand went up in 12-foot lifts, and the arm sections were poured in five increments: a 15-foot lift; three 7-foot lifts; and a 4-foot lift. The final lift contained the reinforcing for the deck.

Cantilever support

The most unique problem involved in building the test stand was that of providing support for the cantilevered section of the concrete deck, which juts out 15 stories above the sloping canyon.

After studying several methods of supporting the cantilevered section during casting, the contractor decided to use a heavy timber tower, capable of resisting any earthquake stresses that might occur while the work was going on. Timber Structures, Inc., subcontractor on the manufacture and erection of the falsework tower, had John J. Gould and H. J. Degenkolb of San Francisco design the structure. More than 240,000 board-feet of lumber—half of it 12×12-inch heavy timbers that extended more than 100 feet from the base—were used in the tower. Its cost, excluding that for labor, came to almost $100,000, but much of this is being recovered in salvage.

Flame deflection pit

Work is currently under way on the 60-foot-deep flame deflection pit that lies 150 feet below the deck of the stand. This is being built to withstand

For more facts, circle No. 216→

Workmen set forming for the instrumentation and control building, which is connected to the stand by a 300-foot-long tunnel. Of reinforced concrete, the building has its side facing the stand covered by earth to reduce the intensity of shock waves.

temperatures of up to 2,000 degrees F which are generated when rocket fuels are fired. The fuels, before being fired, are cooled to temperatures as low as minus 300 degrees F to keep them from chemically reacting with each other and exploding.

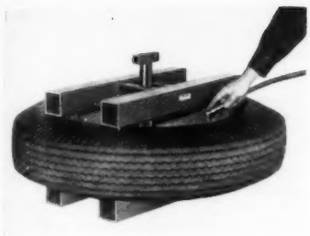
The bottom slab and walls of the pit consist of 18-inch-thick concrete, the top 4 inches of which consists of a special refractory gunite. The use of this special heat-resistant gunite is new in this stand, eliminating the need for a steel deflector surface, such as found in the smaller stands, that has to be cooled with water to withstand the jet forces accompanying the firing of a missile. This innovation is particularly important since water in the Mojave desert is at a premium.

Included in the project are a reinforced-concrete instrumentation and control building, camera and observation posts, and storage facilities for ready rocket fuel, oxidizers, and high-pressure gas.

The instrumentation and control building, located almost entirely underground, has the face directed toward the test stand covered by several feet of earth. This serves to reduce the intensity of shock waves on the structure when missiles are fired. In the building are various instruments to be used during testing. These, including instrumentation and recording facilities, are located on the lower level of the building, together with test areas, and repair and storage shops. The entire instrumentation system to be used here has been designed to accommodate all present and future requirements of large missile static testing. The main floor of the building provides area for test personnel during the actual firing operations. A 300-foot-long tunnel connects the building to the test stand.

Camera and observation posts are provided for in three separate reinforced-concrete structures. These posts are air conditioned and furnished with an air supply that will last 30 minutes at maximum occupancy with all inlets and exhaust ducts closed.

The criteria for the new test stand was developed by the U. S. Air Force engineers, and Lt. Col. Henry W. Yagel, installations engineer for Edwards AFB, is supervising the project for the Air Force. Col. Edwin E. Eads, installations representative, South Pacific Region, U. S. Army Corps of Engineers, is administrator for the project. Responsible for the design and for construction contracts is the South Pacific Region, which is headed by Brig. Gen. William F. Cassidy. Contracts were let through the Los Angeles District of the Corps, which is headed by Col. Arthur H. Frye, Jr. Bruce Bennett is resident engineer for the rocket base. THE END



Device offers protection when inflating truck tire

■ A device that provides protection for the mechanic when he is inflating truck tires is available from Branick Products Co., Inc. The device occupies 13×26 inches of floor space and weighs 67 pounds.

The tire is dropped over the upright center post onto the lower channel sections. The top section is placed on the center post and given a one-quarter turn to lock it. Then the tire may be inflated safely.

For further information write to Branick Products Co., Inc., 1213 NP Ave., Fargo, N. Dak., or use the Request Card at page 18. Circle No. 118.

Line of wire-rope clips covers range of 16 sizes

■ Wire-rope clips for wire rope with diameters of from ⅛ to 1½ inches—16 sizes in all—are available from the Canton Mfg. Co. The clips are offered

Canton wire-rope clips are available in 16 different sizes.

in a plain finish, cadmium plated, or hot-dip galvanized.

The U-bolt portion is made of heavy steel with a malleable saddle that is shaped to fit the wire-rope strands.

For further information write to the Canton Mfg. Co., 2408 13th St. N. E., Canton 5, Ohio, or use the Request Card at page 18. Circle No. 109.

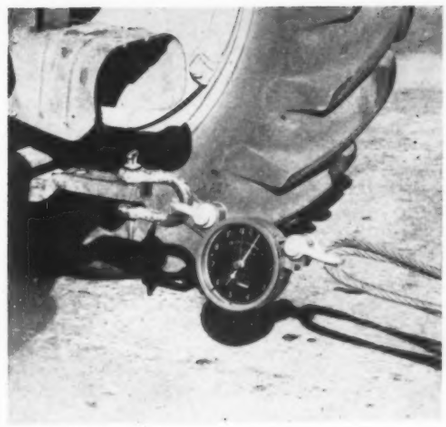
Auger boring machine

■ An auger-type boring machine is described in a catalog from the M. J. Crose Mfg. Co., Inc. Job photos show that the unit can be used for placing concrete and cast-iron pipe. According to the catalog, the machine installs casing as boring progresses, and thus eliminates cave-ins. It is further pointed out that one size auger can be used as a drive auger for installing several sizes of casing.

To obtain Catalog No. 355 write to the M. J. Crose Mfg. Co., Inc., 2715 Dawson Road, Tulsa, Okla., or use the Request Card at page 18. Circle No. 32.

Cleaver-Brooks appoints

The C. H. Grant Co. of 2515 Willow St., Oakland, Calif., has been appointed a distributor of asphalt heating and pile-driving equipment manufactured by the Cleaver-Brooks Co., Milwaukee, Wis. Grant will cover 45 counties around the San Francisco area.



THE DRAWBAR PULL OF THIS JOHN DEERE TRACTOR is accurately measured by means of a Dillon traction dynamometer. The instrument indicates in pounds the amount of drawbar force exerted. With one side of the instrument attached to the rear of the tractor and the other side hooked to a large semi-trailer, braking force is gradually applied to the trailer until the tractor engine stalls. The test was conducted from a standing start. When circumstances prohibit the use of another vehicle, the equipment being tested may be deadended to a secure anchor point and the load applied until the engine stalls or there is a loss of traction. The dynamometer is available in 13 ranges to cover loads up to 100,000 pounds. For further information write to **W. C. Dillon & Co., Inc.**, 14620 Keswick St., Van Nuys, Calif., or use the Request Card at page 18. Circle No 148.

Pervious material for zone 2 and rock for zone 3 of the enlarged Pineview dam are separated by an Allis-Chalmers HD-21 tractor which uses a Fleco rake to work over the materials.

Cuts for road relocation differ on either side of enlarged dam

Mining methods permit 220-foot cut in vertical rock wall; 265-foot left-bank cut is made by scrapers

Enlargement of Pineview Dam near Ogden, Utah—involving highway cuts 265 feet deep, excavation of solid rock 220 feet deep against a near-vertical face, and raising the elevation of an earthfill dam 30 feet while maintaining the reservoir at full level—is as difficult a job as constructing an entirely new dam.

Pineview's enlargement, scheduled to be completed by April, 1957, means that a more dependable water supply can be stored in the reservoir, which will be integrated with the U. S. Bureau of Reclamation's Weber Basin project. The extra 30-foot height of the dam will increase reservoir capacity from 44,000 to 110,000 acre-feet. In the future, the 75-inch penstock line will continue to feed a small hydroelectric generating plant in the canyon below, and a 36-inch-diameter steel outlet pipe will continue to supply water to Ogden. The enlarged reservoir will also furnish irrigation water for some of the land lying between the mouth of Ogden Canyon and Great Salt Lake.

The enlargement is being made by cutting a key into the top of the old earthfill crest, and building from there downstream. Zone 1 of impervious material contains an additional 50,000 cubic yards of fill; zone 2, 55,000 yards of pervious compacted material 8 inches and smaller, and zone 3, an additional 45,000 yards of uncompacted rock fill. Zone 4 will consist of a riprap protection of heavy derrick stone totaling 10,000 cubic yards. When the job is done, the dam axis will be shifted 78 feet downstream, and the 30-foot-wide crest will have an elevation of 4908 instead of the present 4879.

The new fill is being tied into the abutment by drilling and grouting on the right abutment, which will tie into the old sheet-pile cofferdam. Some drilling and grouting is being done also on the left abutment. The three 17 × 17-foot radial gates now in the spillway will be replaced by two 12 × 22-foot radials, and a new highway bridge and operating house will

In place of wasteful and uncertain crankcase-oil changing based upon mileage or hours in service, many operators of heavy-duty construction equipment now use a better guide that saves them both time and money.

Now you can test used oil in minutes

It has come as something of a surprise to some maintenance men to discover that they have been throwing away hundreds of gallons of still-good oil . . . year after year. Conversely, it is quite a jolt to realize that a costly engine-repair job could have been prevented by an on-the-spot analysis that would have shown up the condition . . . in minutes!

The recommendations for oil changes issued by engine makers have always been computed on "averages" for the various classes of vehicle service. And like the "average" man on the insurance chart, the average vehicle doesn't exist in the actual fleet. For example, two bulldozers of the same make and model, operating on the same job, can have quite different patterns of oil economy and engine condition. Obviously no one set of rules can apply ideally to all units. And fortunately there is no longer any need for such generalization.

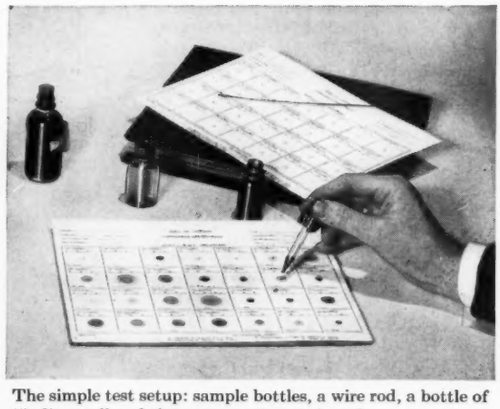
From a couple of drops of used oil, the Shell "ADC* Oilprint Analysis" provides a reliable check of oil condition, in minutes. It is very simple, and with a little practice, it tells you a lot about that oil and the engine that uses it.

What a drop of used oil shows: You place a drop of used oil on a piece of special filter paper supplied by Shell . . . let it stand a minute or two. You will then be able to *see* the following:

Water dilution: Even a tiny amount of water shows up . . . and that means not only that your oil is losing its ability to protect engine parts, but it also shows whether the water represents a normal amount of condensation or something more serious, such as an actual leakage of coolant from a faulty jacket.

Dispersancy/detergency: The same oil drop will give you a picture of how well the special additives in the oil are doing their job . . . whether or not the contaminants are being held in suspension where they do least harm . . . whether the cleansing and dispersing actions are adequate . . . whether the oil is still good.

Adulteration: The color of the oil spot will show whether too much contamination is occurring . . . and will very often point up the cause, indicating a check on



The simple test setup: sample bottles, a wire rod, a bottle of "indicator," and the permanent record card.

This single, on-the-spot sample reveals many things about an engine.

be built to complete the enlargement program.

Heavy highway work

Aside from the difficulty of doing this job while the reservoir level is maintained, Utah Construction Co., Salt Lake City, has found it tough to keep automobile traffic moving while the highway running through the job site is being raised.

The canyon is only 500 feet wide at the site of the dam, which was built in 1935–1936 by Utah and Morrison-Knudsen Co., Inc., Boise, Idaho, under a joint venture. At that time, a state highway leading to Eden was routed through a concrete tunnel that curves sharply into the right abutment. This tunnel had to be opened, so a 220-foot cut was made in solid rock against a near-vertical face to raise the highway on the right bank.

Relocating the Huntsville highway on the other side of the dam required equally heavy excavation. On this left bank, some 120,000 cubic yards of excavation had to be made in one 240-foot-deep cut. Of 380,000 cubic yards of digging for this highway, about 60,000 yards was rock and the remainder was all hard digging. The rock excavation is being done by wagon drilling the material with Ingersoll-Rand machines supplied with air by compressors. Broken rock removed in this operation is being used in the dam itself.

Highway traffic has to keep rolling through the project at all times. This Allis-Chalmers HD-21 tractor works to clean up a boulder that has been shoved onto the roadway while cuts were excavated.

While a 265-foot cut was being made in a hard, conglomerate formation on the left bank and traffic was being carried through a narrow bench, bulldozers pioneered high on the mountainside just above.

Pioneering in the tight places on this mountainside and general duty work are being done by a Caterpillar D6 tractor with an angledozer. Two D8's with dozers and Ateco rippers are also used for pioneering and general utility work. For many weeks, a Cat D9 was used with a heavy ripper to loosen the worst formations. While this material was being pushed over the edge of the cut to the road below, flagmen sometimes had to hold up traffic for a half hour at a time while Allis-Chalmers HD-21 tractors with dozers cleared the material from the highway. This procedure continued for a number of days until the contractor could set three Wooldridge 22-yard scrapers with HD-21 tow tractors and HD-21 pushers to removing the remaining material in the cut. Excavation has been so balanced that this material, like the broken rock, is being used to enlarge the dam, or else is finding its way into highway fills.

Different method

An entirely different method had to be used in making the cut on the right abutment, where a vertical, solid wall of rock had to be removed over the highway tunnel to make room for the new, higher road and the dam. Here, it was impossible to pioneer to the top of the cut and then work down by shoving the material to the edge to be cleared away. If this had been done, damage might have been caused to the existing dam control house and much of its gate-operating machinery.

To get the rock down, the contractor adopted a method used in the mining industry. A 10×10-foot raise, 104 feet high, was driven straight up through the roof of the tunnel to a point high on the hillside, forming an open-throated chute through which broken rock in the topmost portion of the cut could be routed.

Three Ingersoll-Rand 4½-inch stopers did the drilling, supplied with air from a stationary Gardner-Denver 435-cfm compressor and an Ingersoll-Rand 500-cfm Gyro-Flo. The rock, a hard limestone with some quartzite,

Placement of some of the 45,000 yards of uncompacted rock fill in zone 3 is handled by a P&H truck-crane, while a backhoe cleans material from the side of the spillway.

(Continued from preceding page)

broke well under high explosives, but driving the raise was a slow, brutal job. A typical drill round was only 5 feet long, and it required a full shift to drill, load about 32 pounds per cubic yard of Atlas Gelodyn powder, remove drilling equipment, shoot, and muck broken rock out from below in Ford F8 trucks. For safety's sake, the top 14 feet of the raise was drilled and shot from above. Altogether about 400 cubic yards of rock was removed from the raise, which required 35 shifts to complete.

But even with this job done, cut excavation was difficult. The highest point of the cut was 110 feet from the top of the raise, and an ingenious method was devised to train this material into the chute. Jackhammer men, working with safety belts at the top of the cliff, carefully drilled a V-type trench toward the mouth of the raise. This drilled-out pattern was then loaded, an instantaneous cap being used at the edge of the hole and a series of millisecond delays being used to break the rock progressively as the ditch was opened up.

This process of delay shooting was continued so that the high explosives hurled the broken rock into the trench. From here, it went down the raise to a chute at the bottom, where a 5×3-foot gate was installed. Ford F8 trucks picked up their loads by gravity at this gate and hauled the material away.

The only trouble with this method of controlling the removal of rock from the entire upper portion of the cut was that large rock sometimes got stuck in the gate. For this reason, the raise was abandoned before all the rock had been removed from the right-bank abutment. Once the cut had been made below the top point of the raise, officials decided it would be more economical to remove the remaining rock with a power shovel. Ingersoll-Rand wagon drills and 2½-inch Carset bits were used for drilling ahead of the shovel, which loaded into Euclid end-dumps. When this change had been made, the cut material was dumped upstream in a waste area and a substitute supply of rock, located close to the dam, was used to balance the fill in this zone.

Job continues in winter

Even though winter temperatures frequently plummet below zero in this high mountain canyon, the contractor kept the job going throughout last winter, with only about two weeks of lost time. The job was arranged so that work which could be done most favorably was scheduled for winter construction.

The main work on removing the right-abutment rock prism was done during the cold months, the drilling and compressed-air line system being protected from freezing by the use of Tannergas in the main air-delivery lines. This gas effectively prevented drill parts from freezing, and could be counted on to keep equipment operative even if temperatures went to zero.

Whenever possible, drill steel, ripper teeth and shanks, and other moving metal parts were warmed before they received a full working load, so that less stress was put on the steel at extremely low temperatures.

Rehabilitation and strengthening of the artesian-well system in the reservoir was started in December, when the reservoir was at its lowest. One setback occurred on this phase of the job: snow in the mountains, melted

Drilling in the hard rock formation on the left bank is done by an Ingersoll-Rand wagon drill powered by an I-R Gyro-Flo compressor. About 60,000 yards of rock had to be excavated on this side of the dam.

by rain, swelled streams in the vicinity and increased the amount of water in the reservoir by 3,600 acre-feet in a 24-hour period. This was double the recorded inflow for a similar period, and it hampered construction and trapped a small crane and a number of pumps that had been working the reservoir area to tie the artesian-well system with flexible connections under the reservoir.

Personnel

The contractor's field operations are under the general supervision of project manager Clayton Hoon, who is assisted by W. H. Lee, project engineer; Charles J. Getz, office manager; and T. L. Zakotnik, master mechanic. Bureau of Reclamation field operations are under Clinton D. Woods, project manager for the Weber Basin projects. He is assisted by L. R. Dunkley, construction engineer; Ross Billings, resident engineer; and Ed Jeffries, chief inspector. THE END

Sluice gates

■ The HY-Q flush-bottom closure sluice gates are detailed in a catalog from the Rodney Hunt Machine Co. Complete information is given on the design and construction of the gates. Accompanying the design data are numerous diagrams to illustrate the text. Detailed specifications and a table of clearance dimensions are also included in the catalog.

To obtain Catalog No. 75 write to the Rodney Hunt Machine Co., 105 Water St., Orange, Mass., or use the Request Card at page 18. Circle No. 62.

Dial scales

■ Howe dial scales for hoppers, cranes, tanks, and trucks are described in a catalog from the Howe Scale Co., Inc. Information is given on the pointer lock, moisture seal, and locking device; the dashpot control; tare beam assembly; tape-drive dial mechanism; and tapes and button-type connection. Specifications accompany pictures of the various models.

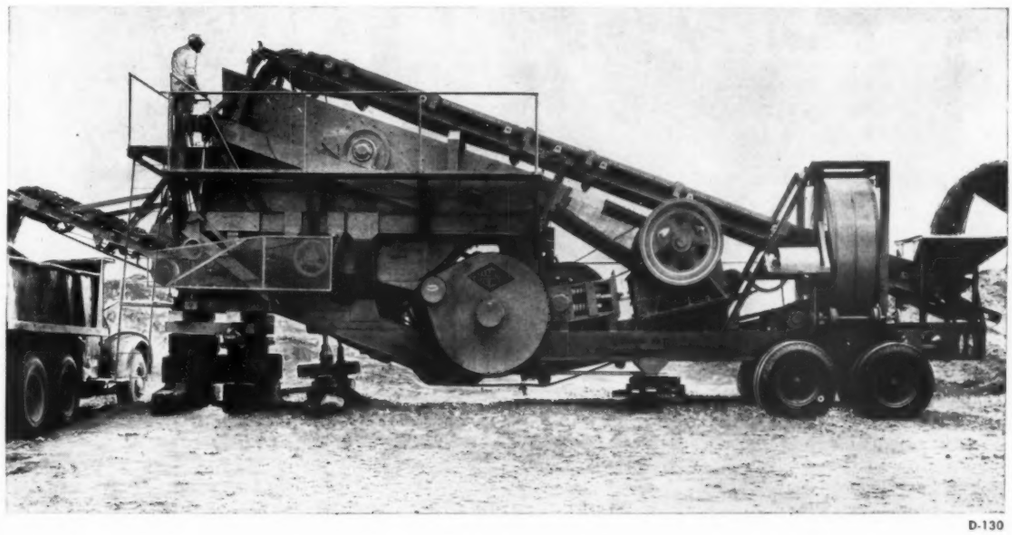
To obtain Form No. 666-A write to Howe Scale Co., Inc., Rutland, Vt., or use the Request Card at page 18. Circle No. 42.

Hubs permit free wheeling when 2-wheel drive is used

■ When a 4-wheel-drive vehicle is operated in 2-wheel drive, the use of special hubs in place of the regular hubs on the front axle will, according to the Warn Mfg. Co., automatically hold the front axle and the front drive train stationary, so that the front wheels will rotate freely. The Lock-O-Matic hubs will fit Willys, Dodge, International, and Napco (GMC) 4-wheel drives from ½ to 1½ tons.

The Lock-O-Matic hubs will automatically lock the front wheels to the axle when the operator of the vehicle shifts into 4-wheel drive. It will automatically lock the front axle and drive train and free the wheels when the operator changes to 2-wheel drive. The automatic change takes place in any gear, forward and reverse.

For further information write to the Warn Mfg. Co., P. O. Box 6064, Riverton Station, Seattle 88, Wash., or use the Request Card at page 18. Circle No. 143.



D-130

A driver uses his radio to call the supervisor at his plant for instructions. The radio control panel, lower right, is mounted conveniently under the dashboard.

Radio aids concrete batching service

by ANDREW M. HILLIARD
Communications Products Department
Radio Corp. of America

When Hilltop Building Materials, Inc., Cincinnati, Ohio, buys a new piece of equipment, a mobile radio is considered an integral part of the unit.

Radio has played an important part in the growth of the firm, which today operates ten ready-mix plants in Cincinnati, Dayton, and Hamilton, Ohio, giving the firm fingertip control of its huge fleet of trucks and enabling it to provide maximum service to contractors.

Hilltop's entire radio system is coordinated by the ten base stations, one located at each plant, which operate on an independent basis. This makes it possible for each plant to communicate with every truck operating out of its yard. The three Dayton radio installations operate on 30 to 50 megacycles in the VHF range. with 60-watt Carfone base stations and 30-watt mobile units. The remaining yards use either VHF or UHF citizens' band in the 460 to 470 megacycle range. These stations are equipped with Carfone 15-watt base stations and mobile radios.

The RCA Service Co., which installed and services the entire system, made sure the radio network operated effectively at the start. The biggest trouble, a coverage problem caused by Cincinnati's famous seven hills, was beaten after RCA engineers conducted an extensive field survey so that they could plan an installation that would assure maximum coverage.

Speeds operations

Better communications have meant better operations for Hilltop—at the yards and on the roads—and better relations with their contractor customers. One direct result has been a measurable increase in production at the plants. Trucks can pick up a full load in a minimum of time, and if a plant breaks down or has a temporary bottleneck, empty trucks heading back for another load can be quickly directed to another yard.

Radio saves drivers' time in other ways too. No time has to be taken for a telephone call to the plant for instructions. If a driver has to make a tough decision, he can always get in touch with his production superintendent at the plant in a moment's notice.

If a truck mixer breaks down—and

A load of concrete is delivered to the mixer mounted on a Mack truck at the Bevis plant. In case of a plant breakdown, drivers will be radioed to pick up their next load at another of the firm's plants nearby.

this sometimes happens despite the daily checks made on their equipment by the drivers—a radio call gets a mechanic to the spot fast. Service personnel can be immediately directed to another job without returning to the plant.

Radio, coordinating the work of trucks and yards, has made it possible for Hilltop to make more deliveries—and higher profits—per day, and has also reduced operating expenses by eliminating overtime at the batch plants. This saving is passed on to the contractor, for it also eliminates the need for their jobs to go on overtime.

Aids contractors

Increased efficiency in Hilltop's operations also means increased efficiency on contractors' jobs. All a contractor has to do is use one of the mobile sets to give instructions to a supervisor or engineer at one of the plants. Last-minute orders and order changes can be handled speedily at any of the company's plants without disrupting delivery schedules. And deliveries can be speeded up or slowed down to meet a contractor's requirements without creating any problems at any of the plants.

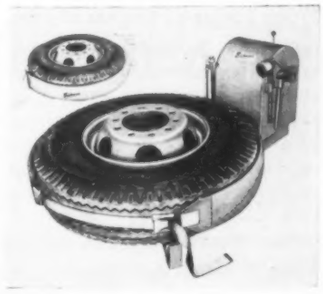
Hilltop officials consider the RCA 2-way radio system a vital part of a complex business. When it was started in 1928, the firm had one yard and a limited suburban operation, but in 1941, the firm was purchased by a corporation headed by I. W. Steele, with the intention of making it a city-wide business. Though World War II prevented immediate expansion, the firm gained experience under wartime restrictions and was able to expand quickly, buying new rolling equipment and erecting new plants as soon as the war was over.

In the huge new operations of Hilltop, radio plays a vital role. It has become such an integral part of the firm's operations that, according to John F. Steele, vice president, Hilltop would not want to operate without it now. THE END

Pneumatic bead expander for tubeless truck tires

■ Expanding beads on heavy tubeless tires is said to be an easy one-man job with a pneumatic bead expander announced by the Bishman Mfg. Co. The unit adjusts for any tire size from 8.20×15 to 12.00×24.5.

The Model 936 bead expander consists of a high-grade rubber tube reinforced on the outside by longitudinal cords to provide a maximum of



inward expansion and equipped with a nylon strap and an airplane-type safety buckle.

A combination valve that opens and closes by a twist makes inflating and deflating fast and easy, the manufacturer states. Full circle compression is said to be powerful enough to seal the beads of the stiffest tire quickly and safely.

For further information write to the Bishman Mfg. Co., Osseo, Minn., or use the Request Card at page 18. Circle No. 141.

Asphalt lute and rake combination announced

■ An all-aluminum asphalt lute and rake combination, for leveling pavements, is announced by the Miller Spreader Corp. One edge of the Lute-O-Rake's T-shaped extruded aluminum blade is straight while the other has teeth like a rake.

Handles for the Lute-O-Rake come in 7 and 10-foot lengths. The blades

The Lute-O-Rake is a combination lute and rake for leveling asphalt pavement.

are offered in widths of 30 and 36 inches. Special internal tube reinforcement at all points of stress is used on the tool to prevent crimping or breaking, the manufacturer points out.

According to the manufacturer, the fact that the braces and handle are slotted and lock-bolted to the T-bar of the blade increase the tool's strength and eliminates any possibility of loosening. The braces are shaped and securely bolted to the handle, holding the blade firmly at the right angle.

For further information write to the Miller Spreader Corp., 4020 Simon Road, Youngstown, Ohio, or use the Request Card at page 18. Circle No. 139.

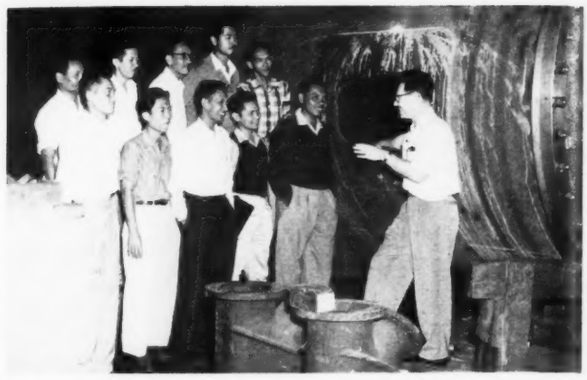
G. R. Schneider retires from Corps of Engineers

George R. Schneider, chief of the engineering division of the Little Rock, Ark., District of the U. S. Army Corps of Engineers, has retired after 25 years of government service. He will become an associate professor of engineering at the State University of Iowa.

Line of electric tools

■ Thor Power Tool's complete line of Silver Line and Speed Tool electric tools for use in construction and maintenance are described in a catalog. Details are given on such items as drills, impact wrenches, nut setters, saws, and valve grinders. Each tool is pictured, and complete data is included on related models, specifications, attachments, optional equipment, and replacement parts.

To obtain Catalog 39-C write to the Thor Power Tool Co., 175 N. State St., Aurora, Ill., or use the Request Card at page 18. Circle No. 68.



INDONESIAN ENGINEERS, CHEMISTS, and technicians inspect a ball mill at the Kennedy-Van Saun cement plant in Danville, Pa. At the plant the men were taught the operation, care, maintenance, and safety features of the machinery and also the handling and bagging of finished products. When they return to their homeland the men will supervise the operation of a cement plant, now under construction, in Gresik on the Island of Java. The plant, constructed by Morrison-Knudsen Co., New York, N. Y., will be equipped with crushing machines, grinding mills, and two 11×375-foot kilns by Kennedy-Van Saun. Full operation for the Indonesian plant is expected by 1957. It will have a capacity of 250,000 metric tons of cement a year to be used in a multimillion dollar program of construction, road building, and dam erection.

more yards per load . . . more loads per hour

DIG MORE Powerful pry-out action and 40° bucket tip-back at ground level get full bucket loads with less spillage loss. Power-transfer differentials provide sure-footed traction for digging power.

CARRY MORE Bucket carry position is close and low for maximum stability. Hydraulic system shock absorber cushions loaded bucket—smooths the ride—permits higher carrying speeds with less spillage.

DELIVER MORE Since you get MORE to begin with and keep MORE while traveling at higher speeds . . . with less spillage in both instances . . . the result—you deliver more yards per load and more loads per hour.

Now you have a choice of three sizes of 4-wheel-drive "PAYLOADER" tractor-shovels, each with *all* the more-productive features pioneered and proven by The Frank G. Hough Co.

They have power-transfer differentials—an exclusive "PAYLOADER" tractor-shovel feature that maintains effective traction on mud, gravel, ice and snow.

They have "no-stop" power-shift transmissions and torque converters . . . planetary final drives . . . power-steering and 4-wheel power brakes.

They have the exclusive bucket motion with 40° bucket tip-back at ground level and powerful pry-out action.

For proof of their superior performance and greater productive capacity on *your* job, ask your "PAYLOADER" distributor for a demonstration.

THE FRANK G. HOUGH CO.
762 Sunnyside Ave., Libertyville, Ill.

Send full data on 4-wheel-drive "PAYLOADER" tractor-shovels.

- ☐ model HO 2¼ yd. payload; 1¾ yd. struck
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- ☐ model HU 1½ yd. payload; 1 yd. struck

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COMPANY

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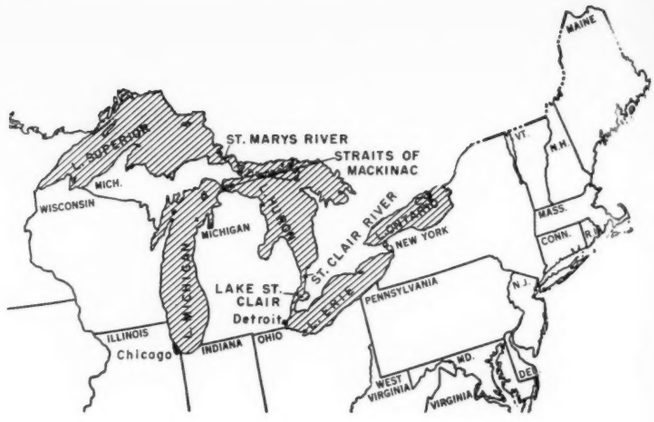
For more facts, use coupon, or Reader-Reply Card opposite page 18 and circle No. 224

Start made on deepening channels linking the Upper Great Lakes



A project that will complement the St. Lawrence Seaway—and money-wise is larger than the U. S. portion of the Seaway—is getting under way in the Great Lakes area.

This is the $150 million Great Lakes Connecting Channels project, scheduled for completion in 1963, which calls for channels in lakes above Lake Erie to be made a minimum of 27 feet deep for both up and down-bound traffic. These channels, generally 25 feet deep for down-bound traffic and 21 feet deep for up-bound traffic, are in the St. Mary's River, which links Lake Superior and Lake Huron; in the St. Clair River, Lake St. Clair, and the Detroit River, which connect Lakes Huron and Erie; and the Straits of Mackinac, between Lakes Michigan and Huron.

The 6-year job is economically justified by the benefits it gives to Great Lakes commerce alone. Incidentally, it will make it possible for deep-draft Seaway traffic to use the lakes. The Seaway, extending inland from Montreal through Lake Ontario and the Welland Canal to Lake Erie, has channel depths of 27 feet. Deepening

The 6-year $150 million job will make channels equal depth of Seaway; harbor study of Lakes Erie, Superior, Michigan, and Huron under way

the channels between Lake Erie and the three upper Great Lakes—Huron, Michigan, and Superior—will make it possible for Seaway traffic to use all the lakes and to go to the junction of the 9-foot channel of the mid-continental waterway system through the Calumet-Sag at Chicago.

Recommended for construction in a U. S. Army Corps of Engineers survey report and authorized by congress last March, the project will start with the dredging of an estimated 2,795,000 cubic yards of rock and earth in the up-bound Amherstburg Channel in the Detroit River between Lakes Huron and Erie. This 8-mile stretch extends from the junction of Ballards Reef Channel and the Livingstone Channel downstream to the Bar Point Channel, about 2 miles above Detroit River light.

This entire work area, except for one disposal ground, is located in Canadian waters and, though details of the agreement between the U. S. and Canada have still to be worked out, Canada has given its assent for the U. S. to do the work.

Work to be let between now and January, 1957, includes that for deepening the St. Mary's River, widening in the two-way down-bound and up-bound channel at Frechette Point, and deepening the up-bound Middle Neebish Channel.

Providing funds become available to carry on the work, it is estimated that the channels for both down and up-bound traffic can be deepened to a controlling depth of 25 feet by June, 1960. By this time, it is expected that the up-bound channels in the St. Mary's and Detroit rivers will have been deepened for 300 of the respective 500 and 600-foot widths.

Both these channels will be used temporarily for both up and down-bound traffic, while the parallel down-bound channels are being constructed. By June, 1962, all the channels should be at a 27-foot controlling depth, and by June of 1963, the entire program will be completed.

Harbor study

Construction of the Great Lakes Connecting Channels project is expected to give rise to additional work —that of deepening the Great Lakes harbors. At present, the U. S. Army Corps of Engineers is starting a comprehensive survey, at the request of congress, to determine the advisability of improving these harbors, none of which have depths equal to those that will be provided in the Seaway and in the channels connecting the lakes. Of 44 improved federal harbors, for instance, three have a 26-foot depth, eleven have a 25-foot depth, five are from 22 to 24 feet deep, and 25 are 20 or 21 feet deep.

The first phase of the survey covers commercial traffic entering or leaving the Great Lakes through the St. Lawrence Seaway. These studies are to be completed as soon as possible so that needed work can start while construction continues on the Seaway and connecting channels. Reports on projects that economically justify domestic Great Lakes traffic alone will not be delayed pending completion of the St. Lawrence Seaway traffic analysis.

Construction of the Great Lakes Connecting Channels project is under the supervision of Brig. Gen. P. D. Berrigan, division engineer, North Central Division of the Corps of Engineers. The contracting officer for all phases of the work is Col. Peter C. Hyzer, Detroit District Engineer.

THE END

The C&D Movalls now fit a greater number of prime movers.

Hauling unit fits most rubber-tired tractors

■ A hauling unit with a dozer-type positive ejector will now fit an increased number of rubber-tire prime movers. The unit, manufactured by the C&D Division of the Yuba Mfg. Co., is known as the Movall. It is available in capacities of from 12 to 26½-cubic-yards struck, with load ratings of from 22 to 45 tons.

The Movall will now attach to the following prime movers: Allis-Chalmers TS300 and TS360; Caterpillar DW10, DW15, DW20, and DW21; Euclid TDT, FDT, and LDT; International 55 and 75; LeTourneau Super C; all models of M-R-S; and the Wooldridge TC142.

The rig's ejector works like a scraper in reverse. Its 140,000-pound push wipes the body clean of such materials as rock, dirt, mud, or sticky clay, the manufacturer reports. The top-loaded unit spreads in even lifts or dumps over the edge of a fill, on grade, or into hoppers at a controlled rate.

For further information write to the C&D Division, Yuba Mfg. Co., 701 East H St., Benicia Calif., or use the Request Card at page 18. Circle No. 135.

Hardsurfacing in plants

■ Ranite hardsurfacing welding materials for cement and aggregate plants are described in a folder from Rankin Mfg. Co. Units of the plants that were hardsurfaced—gyratory crusher mantle, crusher rollers, mill hammers, and screw flights—are pictured and described. Case histories are also included in the folder.

To obtain Form No. 1500 write to the Rankin Mfg. Co., Dept. R-2, 616 S. Marengo Ave., Alhambra 2, Calif., or use the Request Card at page 18. Circle No. 63.

Lift-truck design

■ The latest trends in lift-truck design are shown in a catalog from the Hyster Co. Twenty-five different Hyster truck models ranging in capacity from 1,000 to 30,000 pounds are pictured. The firm's line of Space Savers, Monomasts, Karry Kranes, and Load-Grabs are featured.

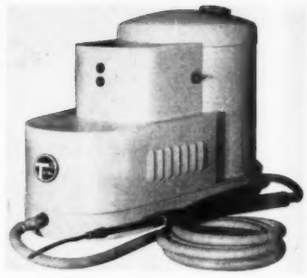
To obtain Form No. 1487 write to the Hyster Co., 2909 N. E. Clackamas St., Portland 8, Oreg., or use the Request Card at page 18. Circle No. 43.

Electric steam cleaner has no flame or fumes

■ A steam cleaner that converts water into steam inside a coil of copper tubing electrically heated on its outer surface is announced by the Turbo Machine Co. The unit delivers 50 per cent saturated steam mixed with the proper amount of detergent to do a proper cleaning job, the manufacturer reports.

The Turbo electric steam cleaner requires a 30-kw power supply. The unit is available in 220, 240, and 550-volt models, two or three-phase. It has a 50-foot working radius and can be used indoors or out. It produces no flame and does not give off fumes.

The self-contained detergent tank provides up to six hours of continuous operation on one filling. If required, additional lengths of steam hose and power cable are available.



The Turbo electric steam cleaner converts water into steam inside an electrically heated coil of copper tubing.

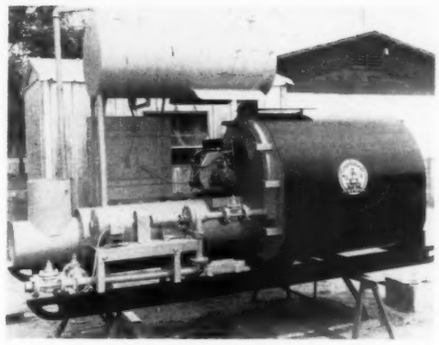
For further information write to the Turbo Machine Co., Lansdale, Pa.,

or use the Request Card at page 18. Circle No. 82.

Impact breaker

■ The Kennedy Cuber Senior, a multi-stage, dual-rotor impact breaker for primary and secondary crushing, is described in a bulletin from the Kennedy Van Saun Mfg. and Engineering Corp. According to the specifications, the feed opening is 36×48 inches, and the unit will reach a capacity of 350 tons per hour. Design construction of the impact breaker is detailed, and job photos are included.

To obtain Bulletin D-1003 write to the Kennedy Van Saun Mfg. & Engineering Corp., 2 Park Ave., New York, N. Y., or use the Request Card at page 18. Circle No. 114.



The new Model D line of Childers circulating heaters comes in four sizes.

Announce line of improved circulating oil heaters

■ A new Model D line of circulating hot oil heaters has replaced the C Model line of Childers Mfg. Co., Inc. The D Model, available in four sizes, incorporates the Childers circular radiating fins which guide the oil through the heater and eliminate the possibility of dead spots and resultant oil deterioration, according to the manufacturer.

The jacketed heat tube and combustion chamber of the old-model heater have been retained in the new line, but they are now insulated.

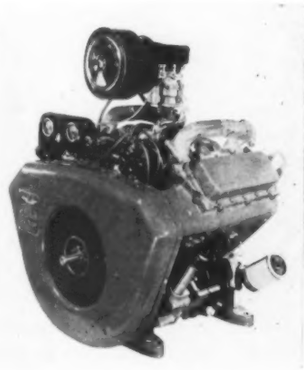
In addition to having increased efficiency, economy, and heating capacities, the manufacturer reports, the new line of heaters has easily accessible controls, assuring greater ease of operation.

For further information write to Childers Mfg. Co., Inc., P. O. Box 6185, Albuquerque, N. Mex., or use the Request Card at page 18. Circle No. 108.

New four-cylinder engine rated at 70 horsepower

■ A new V-type 4-cylinder air-cooled valve-in-head engine designed for the construction field is announced by the Lycoming Division of the Avco Mfg. Corp. Designated as the Model CV4-180, the engine delivers 70 horsepower at 3,000 rpm.

A four-throw three-main-bearing counterbalanced crankshaft and twin



three-bearing camshafts are included in the engine design. All engine accessories are flange-mounted and gear-driven from the timing gear train housing.

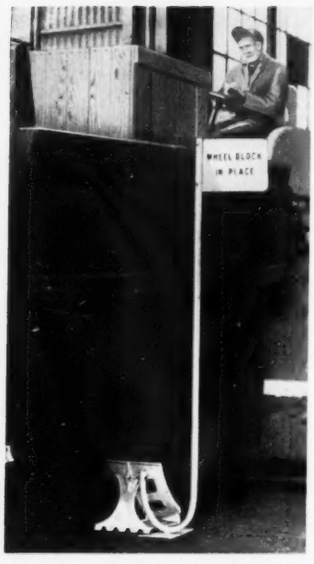
The engine weighs about 470 pounds, less electric starter, generator, and flywheel housing, which are offered optionally. The engine is available with SAE Number 3, 4, or 5 bell housings, as well as with special pump adaptors and shaft extensions, to suit customer requirements.

For further information write to the Lycoming Division, Avco Mfg. Corp., Stratford, Conn., or use the Request Card at page 18. Circle No. 121.

Ditching machine

■ The Middle Incher, an hydraulically operated ditching machine, is described in a folder from The Parsons Co. Powered by a General Motors 6-cylinder diesel engine that develops 147 horsepower, the machine cuts a 46-inch wide ditch to a maximum depth of 7½ feet. Job photos point out that the speed of the conveyor works independently from the speed of the digging wheel. Brief specifications are included in the folder.

To obtain the folder write to The Parsons Co., Box 431, Newton, Iowa, or use the Request Card at page 18. Circle No. 60.



When the Calumet No. WB-15 block is in place, the sign will indicate that the truck is anchored. If the block is moved out of place, the flag will be displayed, providing a warning of unsafe conditions.

Safety wheel block has sign attached

■ A heavy-duty wheel block equipped with a sign to show whether the block is in place during loading and unloading operations is available from the Calumet Steel Castings Corp. The block is designated as the No. WB-15.

The wheel block is a one-piece casting of alloy steel with angular, pointed calks to eliminate slippage. It is designed with rounded sections to prevent possible damage to equipment.

The manufacturer suggests that the enameled sign be attached to the block by means of a vertical standard fitted to a short connecting arm and base plate. The standard is not supplied, but can easily be fabricated from regular ¾-inch pipe or conduit.

For further information write to the Calumet Steel Castings Corp., 1610 Summer St., Hammond, Ind., or use the Request Card at page 18. Circle No. 3.

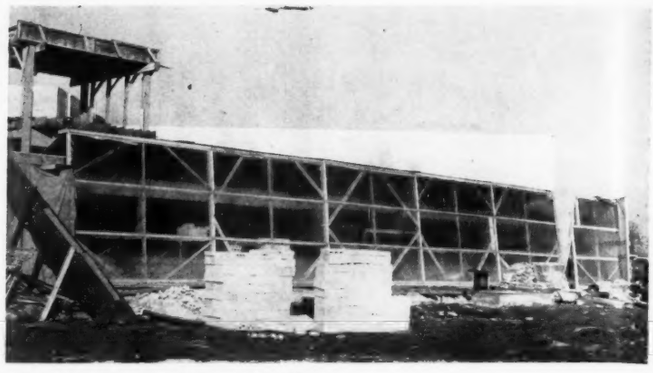
Masonry bits

■ Carbide-tipped masonry bits for drilling holes in brick, concrete, granite, and tile are described in a catalog from the New England Carbide Tool Co., Inc. Complete data is given on the bits, both rotary and hammer, for drilling holes ⅛ to 6 inches in diameter. Specifications are included on two models of rotary bits and two models of hammer bits.

To obtain Catalog No. MBC-56 write to the New England Carbide Tool Co., Inc., Commercial St., Medford, Mass., or use the Request Card that is bound in at page 18. Circle No. 55.

Ravneberg joins L-K-B

Noel M. Ravenberg has joined the consulting engineering firm of Lockwood, Kessler & Bartlett, Inc., Syosset, N. Y. He will be in charge of seismic subsurface investigations, a service for planning the design of highways, dams, and bridges.



MORE THAN 20,000 square feet of 4-mil sisalite polyethylene film was used to keep the icy winter weather out while letting the light in during the construction of a huge shopping center in Wisconsin. The polyethylene was nailed to wooden frames that were leaned against the steelwork of the buildings. The translucent protective covering was left in place on each building until it was completely closed. For more information on the polyethylene film write to the **American Sisalkraft Corp.**, 55 Starkey Ave., Attleboro, Mass., or use the Request Card at page 18. Circle No. 95.

Increase capacity of portable batch lift

■ The latest model of the Burmeister batch lift has an increased capacity of 350 barrels of cement or fly ash. The portable, self-contained Weighmeister batching unit requires only electricity to operate anywhere. It is available with any standard or dual batchers.

Features providing portability and automatic operation include watertight, plug-in electrical connections at the central control panel and an automatic air compressor which is completely piped to all air cylinders and air jets. Because of the automatic operation, the operator is able to weigh out and discharge simultaneously while receiving the cement or fly ash from bulk trucks or railroad cars.

The capacity of the L. Burmeister Co.'s new Weighmeister batch lift is now 350 barrels.

The batch lift is recommended for use as a transfer plant as well as for charging pavers, transit-mix trucks, and central mixers.

For further information write to the L. Burmeister Co., 4535 W. Mitchell St., Milwaukee 14, Wis., or use the Request Card at page 18. Circle No. 91.

Line of winches

■ Applications and ratings for truck-mounted and stationary winches are contained in a catalog from Gar Wood Industries, Inc. Single and double-drum winches, ranging in capacity from 7,000 to 10,000 pounds, are illustrated and described. Drawings and specifications of possible shaft combinations with standard power take-off are included in the catalog.

To obtain the catalog write to Gar Wood Industries, Inc., Wayne, Mich., or use the Request Card at page 18. Circle No. 40.

Flintkote acquires lime products firm

In another move in its program of expansion and diversification, the Flintkote Co., New York, N. Y., has acquired the United States Lime Products Corp., Los Angeles, Calif.

The brand names Boulder Canyon, Sierra, and others for lime products distributed by the U. S. Lime Products Corp., will be retained by Flintkote.

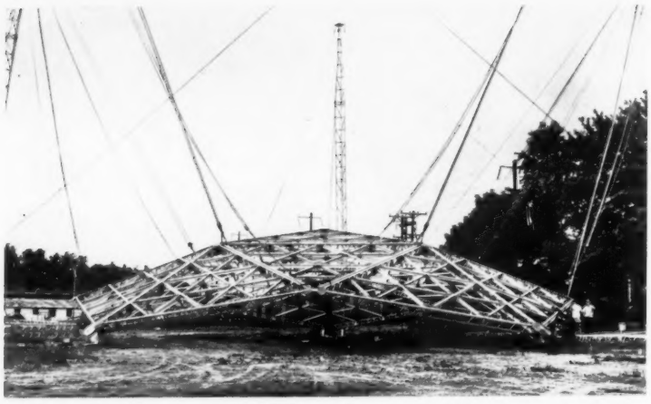
Portable tilt-type mixer has capacity of 3½ feet

■ A portable concrete mixer with a capacity of 3½ feet, plus a 10 per cent overload, is announced by the Kwik-Mix Co. The Dandie Junior is powered by a 2.2-hp air-cooled gasoline engine through a single V-belt. An electric motor is offered optionally.

The frame, mixing drum, and yoke of the Dandie Junior are fabricated of box-section steel, all-welded for maximum strength and minimum weight, the manufacturer reports. A hand-controlled tilting device is slotted to hold the drum in any desired position to allow the operator to discharge a complete batch.

The drum is equipped with four improved mixing blades and a replaceable ring gear. The unit has a drum opening of 17 inches and discharges at a height of 40 inches. The mixer complies with all AGC specifications.

For further information write to the Kwik-Mix Co., 235 W. Grand Ave., Port Washington, Wis., or use the Request Card at page 18. Circle No. 112.



The top ring of five triangles, and the second ring, are lifted 3 feet off the ground by gin poles so that the third ring can be added. A total of 80 major triangle subassemblies makes up the aluminum structure.

Big geodesic dome erected from top down

Structure can be broken down to 100-pound packages for shipment; a 30-man crew erects aluminum dome in field in 2½ days

More than one thing is unusual about the 117-foot geodesic dome fabricated by Washington Aluminum Co., Baltimore, Md., and erected on the company's grounds in Baltimore. The largest clearspan dome in the world to be covered with plastic materials, the 52,000-pound and 46-foot high structure has been designed for the U. S. Marine Corps as a hangar or repair facility that is easily erected and completely portable. Built of noncorrosive aluminum alloy, and having a floor area of 10,700 square feet, the dome's geodesic concept was worked out by R. Buckminster Fuller, inventor-engineer.

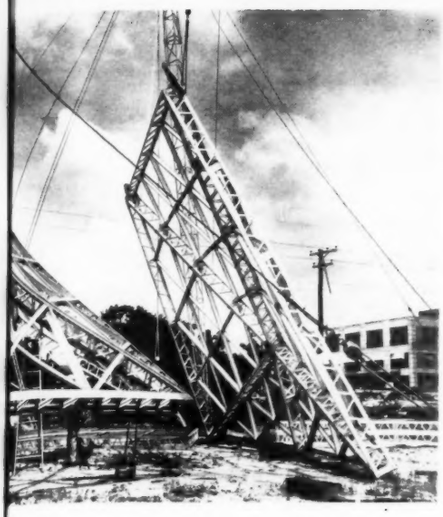
As unusual as the dome itself was the method of erection. Since there was no prototype of the dome, WACO engineers went to work to develop several quick-assembly techniques for the structure.

The dome breaks down into 80 major triangles, which in turn break down into three leg trusses, each about 22 feet long, plus a number of extruded members that receive the plastic skin.

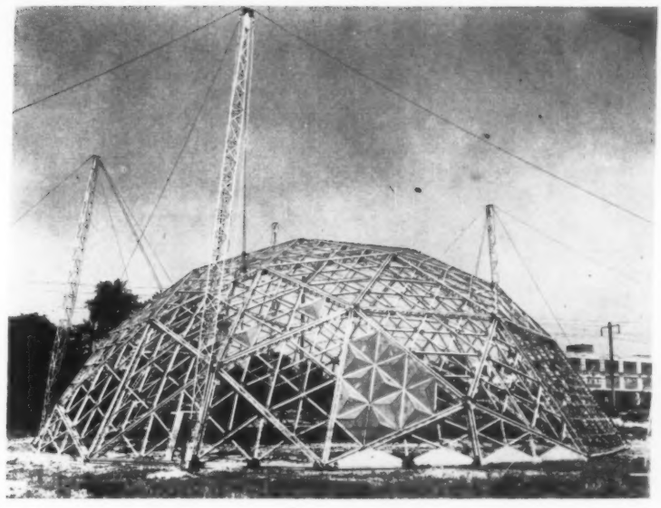
Gin pole method

Since the dome itself consists of a grouping of relatively small components, WACO engineers devised a system of clips and hub plates, in a 9-color coding arrangement, so that unskilled workmen equipped only with wrenches would be able to assemble the sections in a short time.

To avoid the use of unwieldy scaffolding—which would have been required in erecting a dome of this size—WACO engineers used gin poles to support the dome as it was built from the top down, rather than from the bottom up. The gin poles consisted of a light aluminum framework, triangular in cross section, and operated much the same as cranes. Five were grouped around the dome site and guyed to deadmen. Then, after the first five triangles forming the top of the dome had been assembled, winches mounted on the gin poles lifted the assembled section just high enough so that a second ring of triangles could be added. Each winch on each gin pole was operated by one man as a lift was made. The process was continued until the dome was complete—the lifts being made as each addi-



In the last lift, gin poles hold the dome off the ground while smaller segments are lifted into position by auxiliary lift lines from the gin poles. The lower segment is completed on the ground, and the dome section bolted to it.



The dome is 46 feet high and 117 feet across at the base. Some of the Fiberglas pyramids forming the skin of the structure have already been fastened to the skeleton.

tional ring of triangles was added.

In the last 20-foot lift, a load of about 16,000 pounds was evenly distributed among the five gin poles. The segment was supported by the gin poles until the lower segment of the dome was completed on the ground. Then the supported section was joined to the section on the ground.

With the skeleton of the dome complete, workmen attached the doors and the skin covering of Fiberglas. The covering, provided for shelter only, is made of 1,112 Fiberglas pans of a shallow pyramidal form. These pans weigh about 13 pounds each, and approximately four of them were used per leg. They are molded of Owens-Corning Fiberglas, bonded with Durez plastic Hectron polyester resin by W. B. Chance Associates, of Arlington, Va.

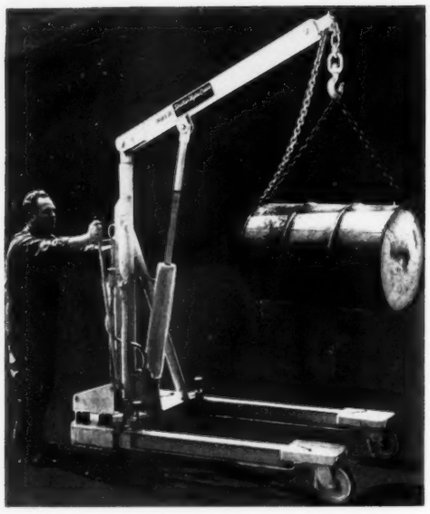
Undergoing test

The dome, which has since been disassembled and flown to the Mojave Desert in California for functional field testing by the U. S. Marine Corps, has a number of advantages as a hangar or repair facility.

The entire 52,000-pound dome, completely portable, can be disassembled and flown to another site in two large modern air cargo craft. All the component parts of the structure can be packaged as units weighing not more than 100 pounds each.

As has been proved at WACO's Baltimore plant, the dome is easily and swiftly erected. A crew of 30 men can handle this job in 2½ days. No maintenance is required for the structure, since it is of non-corrosive aluminum alloy covered with Fiberglas.

And the dome is strong. It has been designed to withstand winds of 150 mph and a 20-pound-square-foot overload, plus the weight of a jet fighter suspended from the dome shell at a number of points. The structure is stressed for much higher loads than is called for by the customary design. Yet it achieves its strength at a weight cost of only 5 pounds per square foot in comparison with the 20 to 50 pounds-per-foot ratio for rectangular buildings. THE END



The Stratton Hydro-Crane Thrift Model is available in a 1, 2, or 3-ton size.

Mobile hydraulic crane in 1, 2, or 3-ton size

■ A portable hydraulic floor crane, available in a 1, 2, or 3-ton size, is announced by the Stratton Equipment Co. The Hydro-Crane Thrift Model is recommended for use in equipment maintenance shops and in handling fuel drums and other materials. It transfers heavy parts, removes engines, raises truck fronts, and does other lifting jobs.

The Hydro-Crane is equipped with a safety release valve that automatically prevents overloading. It features a sliding extension beam that affords 39 inches of additional lifting length or height and adjusts to three different positions.

The rig also has adjustable legs that enable it to straddle large objects; safety plunger foot brakes are another feature. For transporting, it may be collapsed to occupy a minimum of space.

For further information write to the Stratton Equipment Co., 2030 E. 105th St., Cleveland, Ohio, or use the Request Card at page 18. Circle No. 117.

Stumping-block attachment speeds work 30 per cent

■ A stumping-block attachment that reduces working time by as much as 30 per cent is announced by the Rockland Allied Equipment Co. The Rockland three-in-one stumping block is recommended for use as a digging, splitting, or battering tool. The manufacturer reports that it grips the stump, preventing unnecessary skidding and wear on the tractor.

The Rockland stumping block is available for mounting on crawler tractors of all sizes. It may also be obtained for mounting on any specified land-clearing rake, bulldozer, or angle-dozer blade. The attachment is mounted by means of pins and is easily removed when not needed.

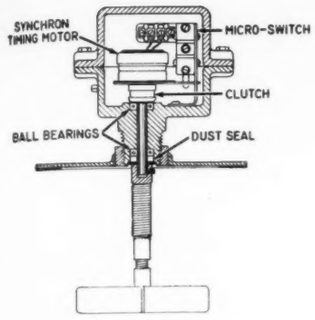
The stumping block is available in models to fit tractors with drawbar horsepower ratings of between 40 and 50, 50 and 70, 70 and 90, 90 and 110, and over 110.

For further information write to the Rockland Allied Equipment Co., 3778 W. Colonial Drive, Orlando, Fla., or use the Request Card at page 18. Circle No. 136.

Emulsion sprayers

■ Cut-back and emulsion sprayers are described in a bulletin from Littleford Bros., Inc. The units pictured and detailed are the Model 93-OB, a 120 to 200-gallon capacity sprayer, and the Model 93-AH, which is said to fit any standard size drum. Both sprayers are mounted on two pneumatic-type disc wheels. Complete specifications are included on the units.

To obtain Bulletin GG-34 write to Littleford Bros., Inc., Box 97, 485 E. Pearl St., Cincinnati, Ohio., or use the Request Card at page 18. Circle No. 48.



Bin level indicator safe in hazardous atmospheres

■ A rotating-paddle-type bin level indicator listed by Underwriters' Laboratories for use in hazardous atmospheres has been announced by the Bin-Dicator Co. The Roto-Bin-Dicator is UL-approved for use in the presence of vapors of ethyl ether, gasoline, petroleum, alcohol, acetone, lacquer solvent, and natural gas.

It can also be used in atmospheres charged with grain dust, carbon black, coal or coke dust, and atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys.

The indicator is designed to indicate or control the level of any bulk material that will flow, such as cement, sand, or aggregate. It is particularly recommended for use on bins under pressure or vacuum. A low-torque motor rotates the paddle at slow speed. Material building up to the Roto-Bin-Dicator stops the paddle and stalls the motor. As the motor stalls, the torque actuates a Micro switch connected to signal lights, horns, motors of conveyors, or feeding machinery.

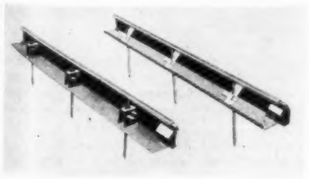
For further information write to the Bin-Dicator Co., 13946–54 Kercheval, Detroit 15, Mich., or use the Request Card at page 18. Circle No. 89.

Line of road forms made of special alloy steel

■ A new line of general purpose road forms, featuring special alloy steel construction and electro-welding, is announced by General Road Machines, Inc. The forms are available in both single and double wedge-lock types.

Tapered, sliding lock-joint connections are said to assure quick, positive alignment. Lock-joint connections also reinforce the form treads at the joints and are reputed to prevent tread distortions, even under heavy loads imposed by road-building machinery.

For further information write to General Road Machines, Inc., N. Main St., Niles, Ohio, or use the Request Card at page 18. Circle No. 79.



General Road Machines road forms are available in both single and double wedge-lock types.

For more facts, circle No. 233→

CUTTING AT THE RATE OF 42 FEET PER HOUR, a Champion Super F concrete saw prepares a section of pavement for a trench-digging project at Lebanon, Pa. The saw was used to cut both asphalt and concrete pavements to an average depth of 5½ inches, to meet specifications calling for a smooth-edged cut for a trench in which new water lines would be placed. The Barry Construction Co., Richland, Pa., was the contractor. For more information on the concrete saw write to the **Champion Mfg. Co.**, 2028 Washington Ave., St. Louis 3, Mo., or use the Request Card at page 18. Circle No. 140.

The Spencer-Safford Loadcraft MT-108-RT tilt-bed trailer has a full-width platform and a capacity of 9 tons.

Light tilt-bed trailer has capacity of 9 tons

■ A lightweight tilt-bed trailer utilizing a full-width platform and a single-wheeled tandem assembly is announced by Spencer-Safford Loadcraft, Inc. The MT-108-RT has a capacity of 9 tons.

A high-tensile, pressed-steel framework is used on the rig to provide maximum strength with minimum weight, the manufacturer states, thus allowing the use of a full-width platform. In addition, the trailer features a rocker-beam tandem assembly, a non-tilting drawbar, and double-acting hydraulic cylinders.

For further information write to Spencer-Safford Loadcraft, Inc., Augusta, Kans., or use the Request Card at page 18. Circle No. 116.

No smoke, soot given off by portable space heater

■ A portable salamander that reportedly gives off no smoke or soot is available from the Scheu Products Co. The Hy-Lo space heater operates on a patented return gas principle which, the manufacturer says, eliminates smoke and soot.

The heater produces between 70,000 and 140,000 Btu per hour using a maximum of one gallon of fuel. The 26-pound rig has a 5-foot-high stack with a diffusion hood.

The Hy-Lo's bowl has a capacity of 10 gallons of oil, enough for between 10 and 20 hours of operation. It lights with a match and has a damper for easy extinguishing. The unit does not require a skilled operator.

For further information write the Scheu Products Co., P. O. Box 262-K, Upland, Calif., or use the Request Card at page 18. Circle No. 151.

The Hy-Lo portable salamander can produce up to 140,000 Btu per hour.

New cooling system pulls air in and blows it out

■ A new type of cooling system that works in the reverse of conventional systems, drawing the cool air in and expelling the engine-heated air by blower, is available from D. W. Onan & Sons Inc. The Vacu-Flo cooling system is optional on all Onan electric generating plants in the 500 to 5,000-watt range. Onan CW models in the 7½ and 10KW sizes have Vacu-Flo systems as standard equipment.

A large centrifugal fan mounted on the front end of the crankshaft pulls cooling air into the engine housing and over whatever component is directly connected to the engine, as for example, a generator used to make an engine-driven electric generating set. As the cooling air continues on its trip, it passes over the engine-cooling fins, and removes the engine heat. The heated air is expelled by the blower.

The new system includes these advantages: the compartment housing the engine - generator combination need be only slightly larger than the unit itself; the same system will cool both the engine and the generator; and sound-proofing is made easier.

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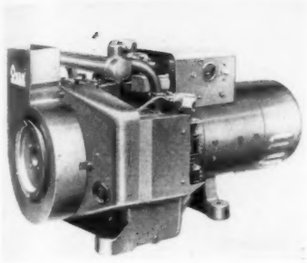


The Vacu-Flo cooling system, here installed on an Onan Model 5CCK-IR 5,000-watt electric plant, draws cooling air in over the generator and engine and then blows it out through an exhaust duct.

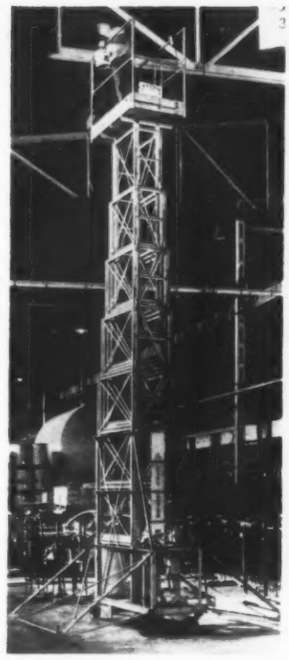
In extremely cold weather, engine running temperatures can be maintained by using thermostatically-controlled automatic shutters in the air outlet scroll.

For further information write to D. W. Onan & Sons Inc., University Ave. S. E., Minneapolis 14, Minn., or use the Request Card at page 18. Circle No. 149.

Folder on waterstops

■ Durajoint and Duraseal waterstops for expansion and contraction joints are described in a folder from W. R. Meadows, Inc. The material for the waterstops is extruded from thermoplastic. The units have a minimum tensile strength of 1,900 psi, and an impact resistance of 40 foot-pounds. According to the folder, the waterstops can withstand temperatures from minus 4 degrees F to plus 176 degrees F. It is stated that the waterstops are resistant to acids, alkalies, chlorinated and sea water, and lubricating and diesel oil. Working details for joints on dams, aqueducts, walls, floors, and ceilings are diagrammed.

To obtain the folder write to W. R. Meadows, Inc., 7 Kimball St., Elgin, Ill., or use the Request Card at page 18. Circle No. 54.



A set of dead-man-type controls is located on the platform and in the base of the Grand-Ski-Ride hydraulic lift.

Hydraulic telescopic lift raises to 40-foot height

■ A mobile, 500-pound-capacity, hydraulic, telescopic lift that can be locked into position at any height between 9 and 40 feet, is announced by the Allied Mfg. & Sales Co. The lift is recommended for use in maintenance and construction work and requires one man for operation.

The Grand Ski-Ride lift contains dead-man-type controls in the base and on the platform. Other safety features include 10-foot 9-inch outriggers, steel-tubing rail and mid-rail, and a safety toeboard on the 2-foot 4-inch × 4-foot platform.

Four heavy-duty, bronze-bearing roller chains support each section. The unit rides on 10-inch textite wheels. Models that lift to heights up to 70 feet are available to order.

For further information write to Allied Mfg. & Sales Co., 3101 W. Grand Ave., Chicago 22, Ill., or use the Request Card at page 18. Circle No. 113.

Heavy-duty excavator

■ Koehring's Model 305 excavator, featuring a ¾-cubic yard dipper capacity is reviewed in a catalog from the company. Descriptions and cutaway views point out that the excavator can be equipped as a shovel, crane, hoe, or dragline. Illustrations show that the unit is available for crawler or truck mounting. The rated lift capacity of the rubber-tire unit is 25 tons; the capacity of the crawler-mounted unit is 15 tons. Data is given on the design and construction of the unit, as well as on the application, operational features, and the attachments.

To obtain the catalog write to the Koehring Co., 3026 W. Concordia Ave., Milwaukee 1, Wis., or use the Request Card that is bound in at page 18. Circle No. 47.

←For more facts, circle No. 234

After a motor grader has scarified the clay-sand-gravel roadway, 3 per cent by weight of bulk hydrated lime is spread over the roadway by a conventional cement spreader.

Lime stabilization technique makes good base course in plastic soils

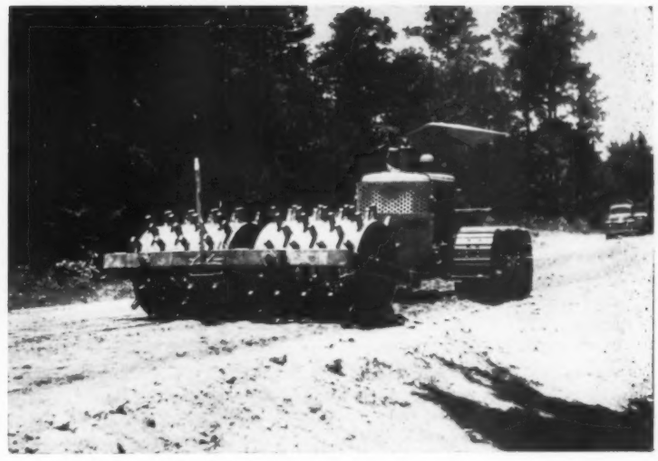
Though soil stabilization is not new in Louisiana, the use of lime as a stabilizing agent for roadway base courses is a relatively new and promising development in the state. The Louisiana Department of Highways, now permitting lime stabilization to be used as an alternate to soil-cement for highway base courses, is already reporting good results on two projects, one completed in 1955 and the other completed last winter.

The third and largest Louisiana road project to use lime stabilization to date—a 9.44-mile gravel section of state route 126 that was reconstructed and surfaced—was recently completed between Grayson and Sikes. Before the work was let, however, cores of the subsoil material were taken every 500 feet to a depth of 3 feet throughout the length of the project and subjected to tests in the soils laboratory of District 5 of the department.

Laboratory tests consisting of the mechanical analysis, physical characteristics of material passing a No. 40 sieve, and an A-group classification were performed on the soil samples. Of the 30 samples, two were selected to represent the entire job. One of these was a hard-packed, red-brown clay loam, having a liquid limit of 29, a plastic limit of 17, and a PI of 12. The other sample was a hard-packed, brown clay loam, with a liquid limit of 22, a plastic limit of 16 and a PI of 6.

Triaxial compression tests were run on the samples in their raw condition; with 3 per cent of lime by weight; and with 6, 8, and 10 per cent of portland cement by volume. These showed that the first sample required 8 inches of better material above it, and the second sample, 2½ inches of better material above it, to support 9,000-pound wheel loads. With 3 per cent hydrated lime by weight, however, both soils could be converted into class I materials for road construction that did not require additional base material to carry 9,000-pound wheel loads. It was also found that 10 per cent cement, by volume, would produce comparable stabilization results.

On the basis of this data, the road was alternately designed for soil-cement, sand-clay-gravel, and lime-stabilized bases, and the job was awarded to W. H. Patterson & Co., Baton Rouge, La., on its low bid of $145,335



A P&H stabilizer mixes the lime and soil. At right, sheepsfoot rollers, to be followed later by rubber-tire rollers, achieved an average compaction of 100 per cent standard density.

based on the lime-stabilized alternate.

Lime applied

Patterson's job consisted of grading and sloping the roadway, improving the drainage structures, using lime to stabilize a 22-foot-wide compacted base, and putting down three coats of bituminous surfacing to a 20-foot width to the Caldwell-Winn parish line. Another project in Winn Parish, involving asphalt stabilization of the base, will complete the surfacing improvement between the two towns.

A motor grader scarified most of the clay-sand-gravel roadway to the required depth; in a few areas where the soil was highly compacted, an old single-pass stabilizer prepared the soil. A total of 1,046 tons of commercial hydrated lime, required to stabilize the 120,728 square yards of roadway, was shipped to a railroad siding near the job site in covered hopper cars and trucked to the job. A conventional bulk cement spreader wagon, attached to the rear of a dump truck, spread the lime uniformly over the scarified soil. The application was made at the rate of 3 per cent by weight, based on a compacted soil density of 110 pounds per cubic foot.

After a tank truck wet the lime a little to control dusting, a P&H single-pass stabilizer mixed the lime and soil. Enough water was added during mixing to raise the moisture content of the soil to the optimum point for compaction. Production of the stabilized base averaged about 2,300 feet per day, and no trouble was experienced in meeting the pulverization requirement—70 per cent of the soil by dry-weight, exclusive of gravel and stone, passing a No. 4 sieve.

As soon as the P&H stabilizer made three passes to work the full width of the base course, the base was compacted with sheepsfoot and pneumatic-tire rollers. Though specifications called for 95 per cent standard density, the contractor had no trouble obtaining 100 per cent density most of the time. As rolling was being completed, a motor grader shaped the crown and grade of the roadway to specifications.

Immediately after smooth rolling had been completed, a protective asphaltic emulsion was applied to the base to protect it against rapid drying

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during the five-day curing period. The emulsion, EA-4, was applied at a total rate of 0.25 to 0.30 gallon per square yard. Two shots of emulsified asphalt, diluted with water, were applied to the base the first day; each succeeding day, a single coat was applied to the base.

Patterson postponed putting down the three coats of bituminous surface after the curing period and until stabilization was substantially complete. To keep the base from drying out and ravelling under the light local traffic during this time, he continued to apply a coat of the diluted emulsion to the base daily.

Other jobs satisfactory

The success of lime stabilization is important to Louisiana. About 3 to 5 per cent of hydrated lime is enough to stabilize many of the highly plastic, fine-grained clays and silts characteristic of the state, to produce a flexible base strong enough to take the load imposed by modern traffic.

Soil conditions along the coastal areas of the state are similar to those in the coastal area of Texas, and it was the success of the Texas State Highway Department in stabilizing plastic clay soils with lime that prompted the Louisiana Department to experiment with the method. The first use of lime was made in Louisiana in 1953, to aid in the pulverization of a sticky clay soil prior to soil-cement stabilization on a 2.5-mile stretch of a state secondary road near Crowley. In this project, lime was used as a conditioning agent to make the soil more friable and easier to work.

The first lime-stabilized base was constructed on a 3.1 mile section of state route 594 near Monroe last year. Between 1953 and the time this job got under way, the state highway department was investigating the practicality of using lime to solve stabilization problems on Louisiana roads. Louisiana engineers were sent to Austin to study the triaxial testing procedure for flexible base pavement design, which was developed and perfected by Chester McDowell, senior soils engineer of the Texas Highway Department. As a result, the Louisiana Department installed triaxial testing equipment in its Baton Rouge soils laboratory and in the eight district soils laboratories. Engineers were trained to evaluate soils with the apparatus and use it in designing stabilized flexible base pavements.

Though the first experimental job near Monroe has been under surveillance less than a year, results to date have been good. Several small dips have occurred in the pavement at the section juncture points, due to insufficient compaction, but no base failures have been detected and maintenance on the section has been drastically reduced.

The second road project having a stabilized base was constructed last winter, lime being used as a stabilizing agent after other methods failed in the difficult plastic soils. This work involved reconstruction and widening of a 4-mile road, known as the Plank Road, in Baton Rouge. On this job, 3 per cent lime was used to stabilize the base for an 8-inch concrete roadway that serves as an access road to an expressway.

Personnel

Louisiana Department of Highways personnel contributing to the success of Patterson's job were E. J. James, chief engineer; R. H. Vaughan, maintenance and construction engineer; J. H. Drake, District 5 engineer; Ellis Ross, assistant district engineer for construction; W. H. Taylor, maintenance design engineer; Dan McDuff, district laboratory engineer, and A. A. Braddock, project engineer. THE END

New lubricants feature anti-wear properties

■ Two improved gear lubricants, developed to keep pace with the lubrication requirements of the higher torque and pressure values incorporated into modern construction equipment, are announced by Lubrication Engineers, Inc. According to the manufacturer, the use of LE 509 and 510 multipurpose gear lubricants can reduce lubricant consumption as much as 400 per cent.

The new lubricants feature special anti-wear properties, the manufacturer reports, that will not only permit gear, pinions, and bearings to last longer but will greatly discount the problem of blown seals and loss of gear lubricant through leakage by reducing excessive internal pressures in gear cases.

For further information write to Lubrication Engineers, Inc., P. O. Box 7303, Fort Worth, Texas, or use the Request Card at page 18. Circle No. 147.

Steel crane wheels

■ Cast steel wheels for overhead or gantry cranes in standard or special design are described in a folder from Farrell-Cheek Steel Co. The F 85 and the hard-edge crane wheels are pictured, and each are accompanied by a table on the Brinell hardness at all points of stress. Information is included on Farrell's rollers, and other products made by the firm.

To obtain the folder write to Farrell-Cheek Steel Co., Sandusky, Ohio, or use the Request Card at page 18. Circle No. 37.

The Stabilift semi-dump trailer can haul a legal payload of 20 tons in most states.

Semi-dump trailer unit carries 20-ton payload

■ A frameless, semi-dump trailer with a front-mounted hoist, capable of carrying a legal payload of 20 tons in most states, is announced by the Cook Bros. Equipment Co. The Stabilift is recommended for hauling in filling, spreading, stockpiling, paving, and general construction work.

The rig is braced all around the dump body by a welded steel channel placed midway up the side of the body. Damage to the upper roll of the dump body by shovel loading does not affect the efficiency of the Stabilift, according to the manufacturer.

Maximum stability is obtained through the use of "tricycle" suspension and by the immobilization of the trailer springs during the final period of the dumping cycle, the manufacturer states.

For further information write to the Cook Bros. Equipment Co., 1815 N. Broadway, Los Angeles, Calif., or use the Request Card at page 18. Circle No. 133.

Blade attachment converts buggy for snow clearing

■ A 50-inch blade attachment for the Prime-Mover buggy transforms the materials rig into a utility snowplow, according to the Prime-Mover Co. The blade can be removed without the

use of tools and requires just a few seconds to attach.

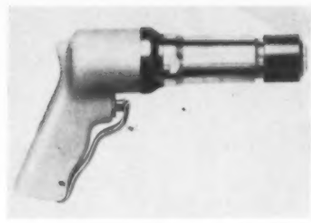
While the blade is being used, the 10-cubic-foot bucket can be filled with ballast or sand for spreading on icy areas. The controls feature a spring-type counterbalance to aid in raising and lowering the blade.

The blade can be set at any angle to either side or straight ahead. Chains can be installed on the drive wheels for extra traction, and dual wheels are also available.

For further information write to the Prime-Mover Co., Muscatine, Iowa, or use the Request Card at page 18. Circle No. 17.

For more facts, circle No. 238→

Heavy-duty air hammer weighs under 4 pounds



■ A heavy-duty air hammer that weighs under four pounds and will deliver 2,200 blows per minute at less than 80 psi is announced by the Superior Pneumatic & Mfg. Co. The Model AD 500 is designed for heavy cutting, chipping, chiseling, or grooving.

A patented safety chuck locks the various tools used with the hammer in six different positions. The tool is said to be extremely maneuverable and can be operated with one hand with a minimum of fatigue.

For further information write to the Superior Pneumatic & Mfg. Co., 4758 Warner Road, Cleveland, Ohio, or use the Request Card at page 18. Circle No. 14.

The new Le Roi air-operated sump pump is rated at 340 gpm against a 10-foot head.

Pump rated at 340 gpm against 10-foot head

■ An air-operated sump pump rated at 340 gpm against a 10-foot head is announced by the Le Roi Division of the Westinghouse Air Brake Co. The pump is available in either steel or bronze, the latter for use in pumping acid or corrosive liquids.

The pump can operate with a maximum head of 95 feet. It has a base diameter of 8 inches and is 23 inches high. The air inlet is ¾ inch in diameter and the discharge outlet measures 2½ inches in diameter. Net weight of the steel model is 56 pounds; the bronze model weight is 75 pounds.

Features of the pump include lightweight construction, low air consumption, a governor-controlled motor, and a built-in lubrication system. The pump does not require priming.

For further information write to the Le Roi Division, Westinghouse Air Brake Co., 3716 W. Wisconsin Ave., Milwaukee 14, Wis., or use the Request Card that is bound in at page 18. Circle No. 77.

In-place density checked with portable instrument

■ Recommended for making rapid in-place density checks of soils and similar materials is the new Volumeasure CN-980 portable tester manufactured by Soiltest, Inc. The instrument is recommended for use on research and construction projects where soils and other materials are being evaluated for natural or compacted densities.

The 13-pound Volumeasure determines in-place soil densities by means of a water-filled balloon and a calibrated cylinder.

The 13-pound instrument operates by means of a balloon filled with water. The water, under pressure, is forced into the balloon until the density hole is completely filled. The pressure is developed by a hand-operated pressure-vacuum bulb system which extends or retracts the balloon in a matter of seconds, the manufacturer reports.

Volume measurements are read directly on a graduated cylinder which has a 1/20-cubic-foot capacity. The cylinder is precision-calibrated to 0.00025-foot divisions.

For further information write to Soiltest, Inc., 4711 W. North Ave., Chicago 39, Ill., or use the Request Card that is bound in at page 18. Circle No. 13.

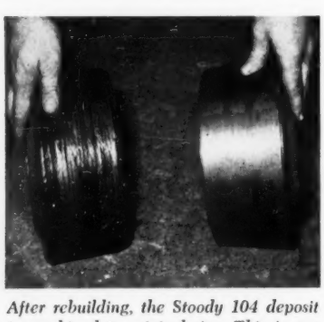
Gar Wood elects

Joseph R. Hager, Jr., has been elected vice president and director of manufacturing for Gar Wood Industries, Inc., Wayne, Mich. Hager joined the company in January of this year as director of manufacturing.

HOUSE ROLLS are automatically built up with 2 or 3 passes of Stoody 104.

How one of the country's large contracting firms MAINTAINS SHOVEL PARTS

The shovel parts illustrated here are typical of those regularly rebuilt and hard-faced by George M. Brewster and Son, Inc., famous for the big jobs handled, such as the New Jersey Turnpike and approaches to the George Washington Bridge. Standard maintenance practice includes complete restoration of worn house rolls, buckets, bucket teeth, pads and tumblers.



After rebuilding, the Stoody 104 deposit is machined to original size. This is one of the few parts requiring machine work. Others go into service "as-welded."

In the Brewster operation Stoody Hard-Facing Alloys are used for both manual and automatic applications. They help to keep equipment in service longer between repair periods and reduce the number of replacement parts that must be stocked. Life of rebuilt parts is invariably equal to or greater than the original equipment—yet the cost of rebuilding and hard-facing is but a fraction of new part costs.

Procedures followed here and by other major earth-moving contractors are described in detail in the Stoody Hard-Facing Guidebook and other Stoody literature; consult your Stoody dealer (see the "Yellow Pages" of your phone book) or write direct for full information.

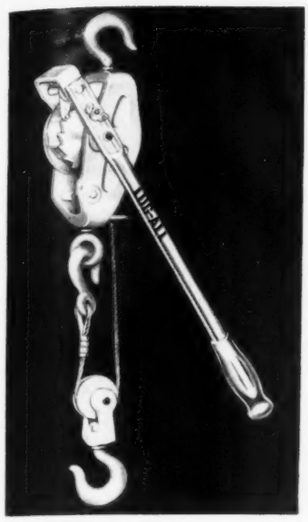
WORN SHOVEL PADS. Conventional treatment includes rebuilding worn areas with Stoody Manganese and manually hard-facing with Stoody 1027.

OTHER SHOVEL HARD-FACING APPLICATIONS

Besides the applications shown, Stoody Hard-Facing Alloys are regularly used all over the nation for rebuilding and protecting Shovel Idlers, Drive Tumblers, Boom Heels, Latch Bars, Latch Plates, Buckets and Bucket Teeth. Wherever there's wear, you'll find effective prevention with STOODY ALLOYS!

STOODY COMPANY
11936 East Slauson Avenue
Whittier, California

For more facts, use Reader-Reply Card opposite page 18 and circle No. 239



With the line doubled up, the Lug-All Model 3000-30 hoist can lift 1½ tons a distance of 15 feet.

Ratchet-lever cable hoist has standard 30-foot lift

■ A ratchet-lever cable hoist with a ¾-ton single-line capacity, that has a standard lift of 30 feet, is announced by The Lug-All Co. The Lug-All Model 3000-30 weighs 13¾ pounds and has a flexible aircraft cable that permits the lifting of ¾-ton load a distance of 30 feet. With the line doubled up, the hoist will lift 1½ tons a distance of 15 feet.

Among the features of the hoist are a main frame of aluminum alloys, oiled-for-life bearings, stainless steel springs, and three workable hooks. A built-in pulley can be used as a snatch block in close-quarter work. Removal of the reversible handle adequately protects the hoist mechanism from tampering, the company points out.

The handle will bend before the unit can be overloaded, a safety feature to prevent accidents. An interlocking pawl system securely locks the load. Free release is possible only under no-load conditions.

For further information write to The Lug-All Co., 355 E. Lancaster Ave., Haverford, Pa., or use the Request Card at page 18. Circle No. 81.

Two new cutting blades added to masonry line

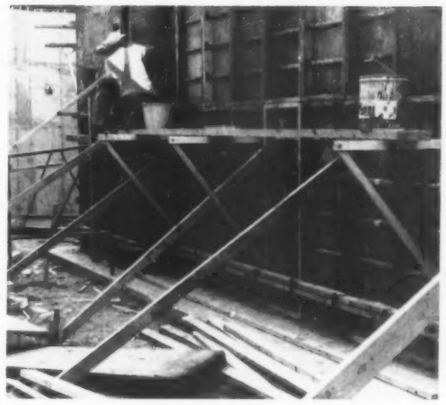
■ A new triple-reinforced abrasive blade and a new diamond blade have been added to the line of cutting disks manufactured by the Clipper Mfg. Co. The diamond blade has been designated the CD-6174-3 and the abrasive blade is known as the CBR-915.

The CD-6174-3 features a usable diamond depth of 3/16 inch and is available in the 14-inch-diameter size. It is recommended for the cutting of glazed tile and is said to provide considerably lower cutting costs at no sacrifice in cutting speed.

The CBR-915 is recommended for use on structural tile, hard brick, and other tough-to-cut materials. According to the manufacturer, it offers speedy cutting and longer than usual blade life.

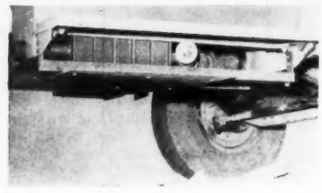
For further information write to Clipper Mfg. Co., 2800 Warwick, Suite 635, Kansas City, Mo., or use the Request Card at page 18. Circle No. 86.

For more facts, circle No. 240→



TWO WORKMEN, STANDING ON A PLATFORM supported by several new-type Symons galvanized steel scaffolding brackets, install forming for the second lift of one of the walls of the $2 million Queen of All Saints Roman Catholic Church in Chicago. The brackets, which are said to be able to support 1,000 pounds each, are secured to the forms with standard form hardware. Completely collapsible, each will accommodate three 2×10's for a platform. Handrail bars will support a 2×4 at a height of 42 inches above the platform. When the handrail is not required, as in this case, the support bar is pivoted down flush with the horizontal member of the bracket. The church project, which is being handled by the L. J. Graf Construction Co., Chicago, involves approximately 30,000 square feet of forming and more than 9,000 square feet of Symons standard forms. Walls vary from 12 to 20 inches in thickness and from 4 to 14 feet in height. For more details on the new scaffolding bracket circle No. 99 on the card at page 18, or write to the **Symons Clamp & Mfg. Co.**, 4249 Diversey Ave., Chicago 39, Ill.

Inside the Lehigh tunnel on the northeast extension of the Pennsylvania Turnpike, John Sullin (left), Senior Inspector of the Bureau of Inspection, and Thomas Oravecz, Director of the Bureau of Industrial Standards, test the atmosphere around an LP-gas-powered Rex transit-mixer equipped with an OCM catalytic purifier.



The OCM purifier, a five-section box-like device, was interconnected into the Rex transit-mixer's exhaust line under the truck running board.

Purifier kills gas fumes on engines run indoors

■ Gasoline and LP-gas engines can safely be run indoors or in unventilated areas with the use of an OCM catalytic purifier according to the purifier's manufacturer, Oxy-Catalyst, Inc. The purifier reduces the carbon monoxide content of exhaust fumes to a point well below the safe maximum of 100 parts per million for an eight-hour exposure, the manufacturer states.

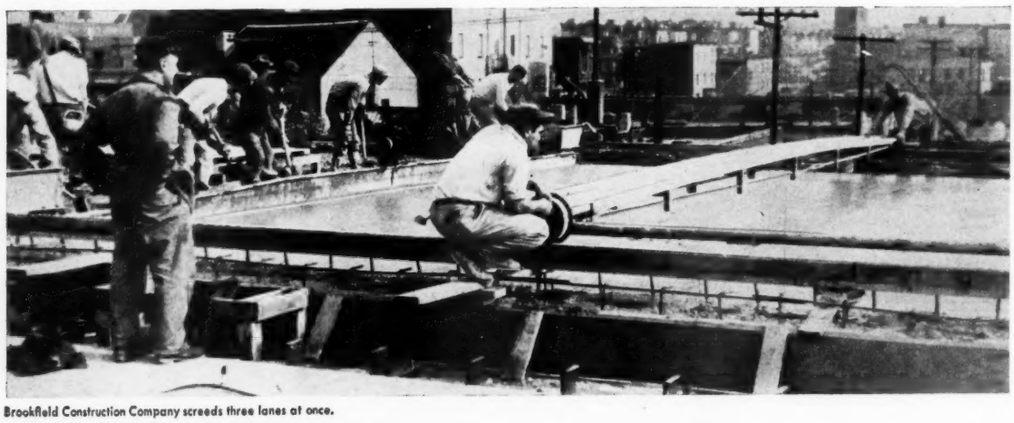
The main component of the OCM purifier is the Oxycat, a cartridge containing porcelain rods coated with an oxidation catalyst. Depending upon the size of the engine, two, three, or more of the cartridges are placed in series in a metal container interconnected into the exhaust line of the engine.

As the exhaust gases pass over the rods, the catalyst oxidizes the carbon monoxide and hydrocarbons to produce harmless carbon dioxide and water vapor.

Tests on a Rex transit-mix truck owned by The Sheesley Co., Allentown, Pa., showed that about 95 per cent of the carbon monoxide was eliminated by the OCM purifier. The tests were made on an LP-gas-powered truck by the Pennsylvania Department of Labor and Industry's Bureau of Industrial Standards in conjunction with the Bureau of Inspection, Division of Mines, Quarries and Explosives inside the Thomas J. Evans tunnel of Pennsylvania's northeast turnpike extension.

As a result of the test, Lipsett, Inc., New York, N. Y., general contractor on the tunnel, received approval from the Industrial Board of the Pennsylvania Department of Labor and Industry to operate a pair of OCM-equipped, LP-gas-powered transit-mixers inside the tunnel.

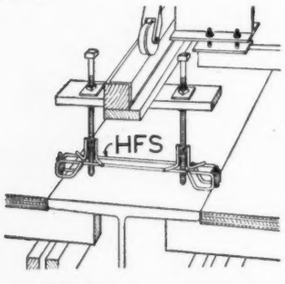
For further information write to Oxy-Catalyst, Inc., Wayne, Pa., or use the Request Card at page 18. Circle No. 78.



Brookfield Construction Company screeds three lanes at once.

Skillful screeding, Richmond supports pay off in fast, accurate slab finishing

A new screeding technique developed by Brookfield's superintendent, Jack Sorensen, paid off handsomely on this elevated highway extension of the New Jersey Turnpike. An 800-lb., 36-ft., vibrating screed blade was used, with supporting angle-covered 3 x 4's held firmly in place every 7-ft. by Richmond Hanger Frame Screed-Rail Supports. This made it possible to screed three lanes in one operation. Besides gripping the rail with extra firmness, the Richmond bases permitted the heights to be set exactly—from the top—with simple screw-head adjustments.



Brookfield's new technique and insistence on Richmond Screed Supports are typical of the emphasis on proper slab finishing among progressive contractors. Good screeding means a lot more than producing a good looking slab. For, unless the surface is finished without dishes or highspots and with design level maintained, the slab will not drain properly and will not satisfactorily resist weather and wear. In order to maintain levels, screed rails must be accurately positioned and held, so that they will not move during pouring and finishing. That is why the construction industry is showing such preference for Richmond Screed Supports with their adjustability and extra strength.

Equally important to good screeding, is having rail supports that are exactly suited to the job and to the screeding equipment to be used. The Hanger-Frame type used by Brookfield is only one of the complete line of Richmond Screeds.

In both the Richmond Standard Series and the special Series D supports, there is a wide range of sizes, weights and models. There are Richmond supports for use with hand screeds and vibratory screeds, and adaptable to power equipment. There are also Richmond heads to match any rail, whether pipe, T-bar, or special shape.

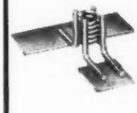
Whatever the type or size, all Richmond screeding devices, form brackets, and form and curb bolts provide the extra strength that not only saves money but ensures a better job. A number of the Richmond supports are shown at right. You will find all of them, and all Richmond screeding items, fully described in a new handbook just published—along with the full line of Richmond-engineered concrete tying devices, anchorages, and accessories. For your copy, or for help on any specific type of concreting problem, write: RICHMOND SCREW ANCHOR COMPANY, INC., 816 Liberty Ave., Brooklyn 8, N. Y. or 315 So. Fourth Street, St. Joseph, Mo.

A FEW OF THE MANY TYPES OF RICHMOND SCREED-RAIL SUPPORTS

Richmond Adjustable Screed Chairs come in both the Standard (½" dia.) and D (¾" dia.) Series. Opposing legs that interlock and cannot spread or bend assure even distribution of load. Two new heights, 7½" and 10", have been added in the Standard Series. For unusually thick slabs, there are Richmond Special Height Screed Chairs.

Richmond Offset Screed Chairs have built-in support to take cantilevered load when rail must be placed above surface, as, for instance, when reinforcing steel runs opposite to screeding direction. Richmond Offset Screed Head can be quickly adjusted from above with speed wrench; is double-ended for use with either pipe or T-rail.

Richmond Fill-Type Adjustable Screed Base, used when slab is over soft fill, provides stability with four extended legs driven into ground. Richmond Sub-Grade Stake (not shown) does similar job for heavier loads below grade.



Richmond-Sub-Grade Base provides 2"-high support with unequal bearing plates. It is used mainly with shorter screed bolts or as base for form bolt. Sub-Grade Chairs (not shown), 3½" to 18" high, are also available for soft sub-grade fill.

Richmond Form Bracket, can be nailed to a joist to support a screed bolt extending through the decking. May also be used in conjunction with a curb bolt to support and position a curb form. Consists of a ½" or ¾" coil welded to a steel plate equipped with four nail holes.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 241

Cable installing catalog

■ A catalog on the complete line of cable installation equipment is available from T. J. Cope, Inc. Items covered include cable bands, bond plates, conduit tools, underground and aerial feeder cables, rod grapples, jacks, mandrels, pullers, and racks. Data on sheaves, shields, swivels, and splicers conclude the 40-page catalog. Each item is pictured, and described, and brief specifications are given.

To obtain Catalog No. 65 write to T. J. Cope, Inc., Third and Walnut Streets, Collegeville, Pa., or use the Request Card at page 18. Circle No. 29.

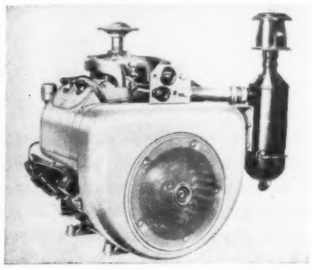
Bros Boiler appoints

Donn Bros is the new assistant sales manager for the Road Machinery Division of Wm. Bros Boiler & Mfg. Co. of Minneapolis, Minn. Mr. Bros, who joined the company in 1947, was formerly the technical advisor for the firm on compaction, bituminous handling, and rotary snowplow equipment.

Air-cooled, 30-hp engine runs on variety of fuels

■ A 30-hp, heavy-duty, air-cooled engine that will operate on kerosene, natural gas, LP fuels, or fuel oil of from 38 to 42-degree Baume gravity and 35 octane rating is announced by the Wisconsin Motor Corp. The Model VH4 is a 4-cylinder, V-type power plant.

The new engine is of high torque design and operates at a maximum



2,800 rpm. It is available as an open engine with or without side-mount fuel tank or as a completely housed power unit with either built-in or under-slung fuel tank.

Special equipment available for the engine includes hydraulic pump, visual-type air pre-cleaner, rotating screen, automatic high temperature switch, electric generator and starter (or starter only), clutch assembly, reduction assembly, or clutch-reduction assembly combination.

For further information write to the Wisconsin Motor Corp., 1910 S. 53rd St., Milwaukee 46, Wis., or use the Request Card at page 18. Circle No. 15.

Trencher attachment now will fit more tractors

■ The heavy-duty trenching attachment manufactured by the Arps Corp. is now available for several new tractors. The trencher, available in boom lengths providing digging depths of 3½, 5½, and 7 feet, is called the Trench Hog.

The Trench Hog can now be attached to the Ford 800, the Ferguson 40, the Massey-Harris 50 utility, and the John Deere 420W tractors. The trencher is equipped with quick-change cutters in from 6 to 20-inch widths. Special cutters are available for rocky or frozen ground.

For further information write to the Arps Corp., New Holstein, Wis., or use the Request Card at page 18. Circle No. 87.

Carbide percussion bits

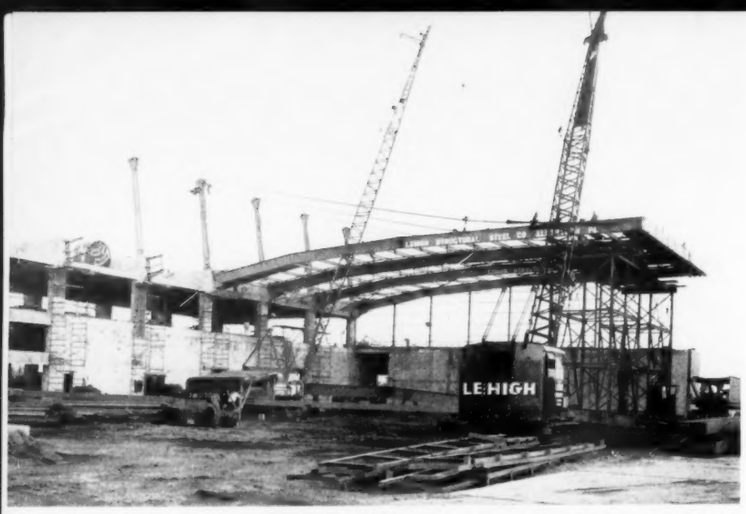
■ Percussion bits and carbide blanks for bottoming drive rods are featured in a catalog from the Vascoloy-Ramet Corp. Bits and blanks are described for seven types of shoulder drive rods and for push-on rods. Carbide bit blanks for 4-point and chisel-type intra-set steels are cataloged. Breakaway and overhand style bits are illustrated. Charts specify 19 sizes of the "long body" bit.

To obtain Catalog V-R 486 write to the Vascoloy-Ramet Corp., 800 Market St., Waukegan, Ill., or use the Request Card at page 18. Circle No. 69.

LATEST ADDITIONS TO THE FLEET of Fruehauf trailers operated by the Citizens Transportation Co., Riverside, Calif., are four 37½-foot-long drop-frame rigs which can haul 74,400 pounds, gross weight. The trailers have a 14-inch drop frame to accommodate large concrete pipe, such as that pictured, weighing 11½ tons per section. This concrete pipe has a 9½-foot inside diameter and each section measures 8 feet 4 inches in length. It is being hauled for the American Vitrified Products Co. For further information on the drop-frame trailers write to the **Fruehauf Trailer Co.**, 10928 Harper Ave., Detroit 32, Mich., or use the Request Card at page 18. Circle No. 98.

Bridge cables suppo anti

High-strength cable is anchored to lean-to-type structure to hold ten 130-foot girders over 53,000-square-foot floor



A Manitowoc 3000 crane with a 95-foot boom and 30-foot jib places 10-inch purlins, 30 feet long, between the girders. This crane and another Manitowoc were also used to position the long girders. *C&E Staff Photos*

Unique support for the ten 130-foot-long cantilever girders forming the roof of the world's first lean-to-type aircraft maintenance hangar is provided by 20 high-strength bridge cables. These are anchored to the two-story reinforced-concrete lean-to structure being built for Trans-World Airlines at Philadelphia International Airport.

The cantilevered girders, which have a slight curve, are fastened to the concrete lean-to forming the north portion of the structure and span about 130 feet over the unobstructed 53,000-square-foot hangar floor.

Piles anchor structure

Steel for the hangar was fabricated by Lehigh Structural Steel Co., Allentown, Pa., so that Lehigh Construction Co., the steel erector, could begin erection operations in May of this year under a subcontract from Baton Construction Corp., Philadelphia. By this time, Baton had completed the two-story north lean-to that forms a rear wall to support the roof. Perpendicular to this 40-foot-wide and 270-foot-long structure, Baton built a 20-foot-wide one-story structure that will be used as a truck entrance and for inflammable storage, sanitary disposal, and fleet servicing.

The first floor of the north lean-to will contain a garage, paint shop, parts storage section, main entrance vestibule and lobby, telephone room, offices, electrical vault, and a room for boiler and mechanical equipment. The 12,200-square-foot second floor has space for offices, an assembly room, a pilot's room, a hostess' room, and first-aid and service areas. A 2,600-square-foot mezzanine was formed in only two bays of the building to provide for locker and lounge rooms.

Steel H-section pilings that go about 65 feet into the ground tie into the two-story structure to prevent the weight of the cantilevered roof from overturning the building. Ten reinforced-concrete roof beams are the most important element of the building's anchorage system. These 6-foot-deep and 2-foot 7-inch-wide beams, spaced on 30-foot centers to form the nine bays of the hangar, serve as the anchors for the ten cantilevered roof girders. The second floor and mezzanine of the hangar are hung from the concrete anchorage beams by rods of from 2 to 3¾ inches in diameter.

The 36 WF girders, delivered by truck to the hangar site in two sections, were joined by a welded field

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...antilevered hangar roof

by ANTHONY N. MAVROUDIS, field editor

The two cables supporting each girder run over a 28-foot tower column atop the 66-foot anchor beam of the two-story north lean-to, to be anchored to the roof beam of the structure. Piles tied to the rear of the structure keep it from overturning.

splice. Four of the 36 WF sections making up each member required three welded splices, two of which were made in the shop and one in the field. The later weld was made with each section laid in position on the ground. Each of the straight sections have a tapered end, and this gives the girder a predetermined curve.

The inboard end of each cantilevered girder is connected to the end face of each 6-foot-deep anchorage beam, which is on a slight angle to the vertical. The girder connection was made through four 3-inch-diameter anchor bolts that were placed in 7-foot-long 6-inch-diameter sleeves embedded in the anchor beam. A simple nut connection against the flange of the sleeve was all that was necessary to position and fasten the high-strength anchor bolts. The actual length of each bolt is about 13 feet and about 5 feet 11 inches of each bolt protrudes from the face of the anchor beam. About 2½ feet of the protruding section was threaded to make the bolt connection with the girders.

The 5-foot 11-inch section left protruding allowed each bolt to be prestressed to 87.5 tons after the girder had been placed. These four anchor bolts were placed in two horizontal rows, exactly 4 feet apart as measured along the face of the anchorage beam. A steel billet plate, about 2 inches thick, was then placed against the anchor beam and grouted securely into position so that the anchor bolts pass through the plate. At this point, Lehigh was able to place a girder.

Lehigh covered the bolts with pilots —pipe lengths tapered to a point to protect the threaded portion of the bolts—before the girders were lifted into place over the anchor bolts. Even though each girder weighed only about 16 tons, two cranes were used to set it in place because of its 130-foot length. Two Manitowoc cranes, a 3000 with a 95-foot boom and a 30-foot jib, and a 2000 with a 70-foot boom and a 20-foot jib, made their pick-ups around the outer quarter points of each girder.

Prestressing anchor bolts

The inboard end of the girder, reinforced with welded sections to form a rigid column-type base, was slipped through the anchor bolts, and the cranes supported the girder in this position until the anchor bolts were prestressed.

Prestressing was done by a 100-ton hollow-cylinder hydraulic jack, with an auxiliary yoke over the anchor

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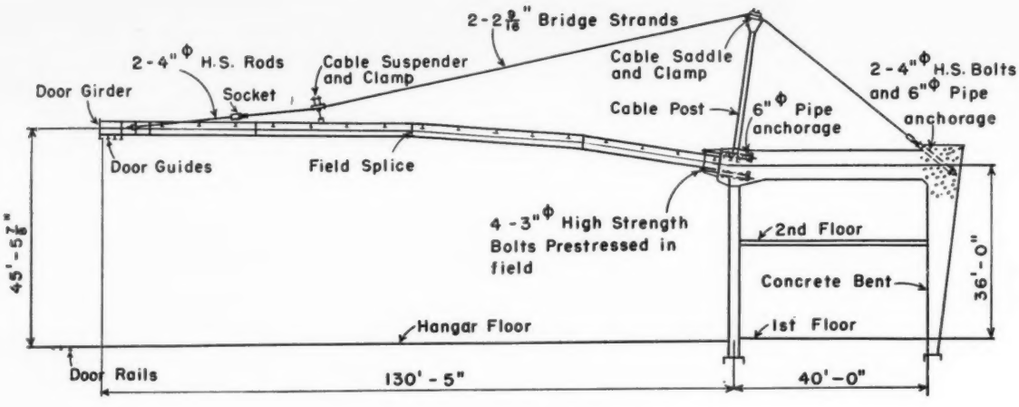


This cross-section of TWA maintenance hangar shows connections of overhead bridge-type cables to cantilever girder and lean-to.

(Continued from preceding page)

bolt nuts, which jacked against a second nut placed on the outside end of the anchor bolt. Once the gage on the jack read 87.5 tons, jacking was stopped. Then the anchor bolt was tightened with a striking wrench until the load on the outside jacking nut had been transferred to the connecting nut on the girder.

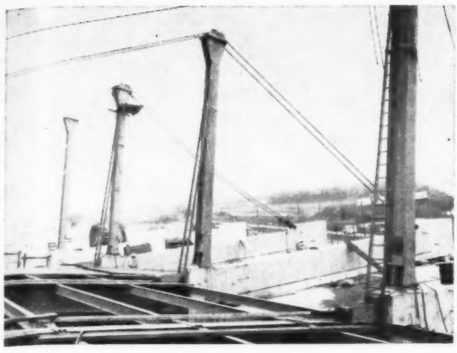
The load transference was noted by the drop of the gage indicator on the jack. When the gage read zero and all the load had been transferred from one nut to the other, Lehigh removed the outside nut and the jack. This operation was repeated on the remaining three anchor bolts on each girder.

The prestressing of the anchor bolts made it possible for Lehigh to be sure of the initial load on the anchor bolts before the load of the cantilevered girders was imposed on them. If it had not been done, many variables would have been introduced into the design of the structure.

Immediately after prestressing had been completed, the outboard end of a girder was placed on a 41-foot-high erection bent that was equipped with jacks and capable of supporting two girders at a time. Two such bents were used to complete steel erection. As soon as each pair of girders had been set and was completely supported by the overhead bridge cables, the erection bent was moved into position to support another pair of girders.

Bethlehem Steel Corp. furnished the twenty cables—two for every girder—that support the cantilevered roof. The 2 9/16-inch-diameter cables, with an over-all length of about 150 feet, were tested by the world's largest universal testing machine at Lehigh University to insure a minimum breaking strength of 392 tons. During their manufacture, the cables were pre-stretched to remove any structural elongation that would occur under load conditions.

The outboard ends of the cables are attached to the girder through two 4-inch-diameter rods about 30 feet long. The inboard ends are anchored to the north lean-to anchor beam through two 4-inch-diameter high-strength rods about 11 feet long. These rods are fastened to the anchor beam through 6-inch-diameter sleeves embedded in the concrete. The 11-foot



Girders are fastened to the inclined face of the anchor beam by four 3-inch-diameter bolts that were prestressed to 87.5 tons before the load of the girder was imposed. Cables are fastened to the rear of the anchor beam by two 4-inch-diameter rods passing through sleeves embedded in the beam.
C&E Staff Photo

rods are threaded on both ends. One end was threaded to take the nut locking the rod with the embedded sleeve; the protruding end was threaded to take the cable socket.

These rods, as well as the 30-foot-long rods, are made of alloy steel that has been quenched, tempered, and extensometer-tested. Designed to withstand a 980,000-pound load, they were tested to destruction by the Lehigh University machine. One of the rods tested was pulled apart at 1,552,000 pounds. An assembly consisting of a length of cable, socket, and anchor rod was tested to a required 784,000 pounds of ultimate strength.

The strands rise from the cable anchors over a 28-foot-high tower column, which is topped with a cast-iron saddle capable of supporting two cables. The cable was then strung out on planking laid alongside the girder to be supported. This timber planking was held by 10-inch purlins, 30 feet long, which were placed between girders to form the finished roof support. Russell, Burdsall & Ward high-strength bolts, used to make the purlin connections, were placed with Chicago Pneumatic impact wrenches powered by an Ingersoll-Rand air compressor located on the ground.

The job of making the outboard connection between the cables and girder was started when the Manitowoc 3000 crane placed the 30-foot long rod on two roller assemblies. The cable was then connected to the rod by means of a threaded cable socket which screwed onto one end of the rod. The use of the two rollers simplified this operation by allowing the crew to use chain wrenches to roll the rod into the cable socket, which was supported by the crane.

Using a block and tackle assembly operated by a manual winch, Lehigh positioned the rod through a reinforced plate welded on one side of the girder web. The second support cable, on the opposite side of the girder web, was placed in the same manner.

A nut was placed on the end of the rod, after the rod was passed through the opening of the connecting plate, and tightened initially by hand. A similar connection was made on the opposite side of the girder to complete the girder support.

When all the girder connections had been made, the loads were transferred to the cables. Each girder was raised to the desired elevation by the jacks on the bents, and the nuts were tightened by a striking wrench until the load was completely picked up by the cables. This done, the contractor moved the erection bent to another pair of girders.

An anchor plate, bolted to the tower saddle, grips the cables passing over the saddle. The estimated total load on each cable is approximately 150 tons—a good deal under its minimum required strength of 392 tons.

Facial girders

The extreme outboard ends of the roof girders support a continuous facial girder, composed of plates and angles, which support guides for the tops of the sliding hangar doors. Riveted connections were made to the upper and lower flanges of a girder, and to the first stiffener of a girder. Four T-beams, placed under the facial girder, serve as guides. They give partial support to the hangar doors by riding on the inside flanges of the T-beams. The 14 electronically controlled, individually operated doors, offering an opening 44-feet in height, are also supported on rails at ground

Bethlehem Steel cables are strung out on planking alongside a girder by the crane. The 30-foot-long 4-inch-diameter Bethlehem anchor rod is on two roller assemblies and is turned by chain wrenches while the cable socket is supported by the crane.

C&E Staff Photo

(Continued from preceding page)

level. These will be heated to assure smooth operation during winter months.

To accommodate the sliding steel doors when they are fully opened, the facial girder has been extended about 42 feet on either end. Curtain sidewalls completely enclosing the hangar will be supported by the overhead girders and east lean-to.

With the steel work completed, Baton began placing the interior and exterior surfaces. The completed roof, which is designed to rise 16 inches and fall 14 inches from a normal position under operating conditions, will be topped with precast-concrete planks that span the purlins. These will be covered with 1½-inches of built-up slag.

When it starts operating at the end of this year, the hangar will be complemented by 210,000 square feet of taxiway and parking facilities for 200 automobiles. It is estimated that the new structure will allow TWA to more than double its maintenance operations at the airport. The hangar has been designed so that a 270-foot addition can be made in the future to give the structure a total of 130 × 540 feet of unobstructed floor area.

Personnel

E. Steinmetz was the superintendent and Allan Murphy, the field engineer, for Lehigh Construction. The Ballinger Co., Philadelphia, is the architectural and engineering firm which designed the unique $1,225,927 structure. Ammann & Whitney, New York, N. Y., was retained as the consultant structural engineering firm during the steel erection. THE END

Piston assemblies boost horsepower of diesels

■ An increase in lugging power of 20 per cent and a reduction in the amount of down shifting required can be expected with the use of M&W add-Pow'r pistons on Caterpillar and International diesel rigs, according to M&W Tractor Products, manufacturer of the pistons. The manufacturer states that the installation of the new pistons results in a horsepower increase comparable to a tractor of the next larger size.

The add-Pow'r pistons employ Cyclan rings which are reported to be able to withstand temperatures 50 per cent higher than those at which standard piston rings fail. The Cyclan rings have twice the strength of standard iron rings with equal wearing quality, the manufacturer states.

For further information write to M&W Tractor Products, 5090 Green St., Anchor, Ill., or use the Request Card at page 18. Circle No. 138.

Cement intensifier

■ Insuro, a liquid chemical cement intensifier, can be used in cement walls, floors, and foundations, tunnels, dams, bridges, and for reinforcing concrete roadways and walks, according to a bulletin from the Insuro Chemical Co., Inc. The bulletin states that the compound, added as part of the gaging water to portland-cement concrete, accelerates and hydrates the cement particles, thus producing a strong and dense concrete. How the chemical is mixed, where it is used, and the advantages of Insuro are listed in the bulletin.

To obtain Form No. 3B write to the Insuro Chemical Co., Inc., 15 Union St., Lawrence, Mass., or use the Request Card at page 18. Circle No. 46.

Two Ferti-Blast spray guns are used to spread fertilizer along the roadside of a New York State highway.

Spray gun powered by air compressor

■ A portable spray gun for the air-blast application of pelleted (granular) fertilizer, grass seed, and limestone is announced by the Chowning Regulator Corp. The Ferti-Blast gun is recommended for use in seeding and maintaining roadsides and median strips.

According to the manufacturer, an untrained operator is able to spray 25 pounds of granular fertilizer per minute with the spray gun. A compressor delivering 125 cfm of air at an average pressure of 90 to 110 pounds can power two Ferti-Blast guns simultaneously. The units will spray material up to a distance of 75 feet.

In operation, the spray gun is usually connected to a compressor which is towed behind a truck carrying the spray operators and the bags of material to be sprayed. A feeder is inserted into the material bag near the bottom and the material is drawn up through the feeder line and out of the spray nozzle.

For further information write to the Chowning Regulator Co., Corning, N. Y., or use the Request Card at page 18. Circle No. 76.

Structural framing

■ Litebilt nailable structural framing is designed for studs, joists, roof decks, and louvres, according to a catalog from Dominion Bridge Co., Ltd. The light-gage steel sections are developed by a cold forming process. Various kinds of partitions are diagrammed. A series of job photos illustrate use of the framing.

To obtain Catalog No. S-113 write to Dominion Bridge Co., Ltd., P. O. Box 280, Lachine, Quebec, Canada, or use the Request Card at page 18. Circle No. 34.

E. H. Wachs Co. buys James B. Clow & Sons

The entire line of Clow-Strickler hand-operated ratchet-action pipe cutters has been purchased from James B. Clow & Sons by the E. H. Wachs Co., Chicago, Ill. Wachs will continue to build and service the cutters under the name of Wachs-Strickler.

Sales and service will be handled through James B. Clow & Sons and other Wachs dealers.

"... and what's your squawk?"

The Model 600, largest of the TerraTrac line, with the new radiator guard, extra-large tilt cylinders, and a revamped dumping mechanism.

Tractor-loaders feature easier digging, dumping

■ A number of engineering advancements incorporated into the Terra-Trac line of crawler tractor-loaders greatly increases the ability of the rig to dig and dump sticky materials, according to the manufacturer, the American Tractor Corp. The Terra-Trac line includes eight gasoline and diesel-powered crawlers of from 36.5 to 62 horsepower.

One of the new features is designed to jar wet clay and muck out of the bucket instantly at all dumping heights. It involves extra-large tilt cylinders and a revamped dumping mechanism. As the bucket swings into the fully dumped position, the tilt arms strike the ends of the lift arms, producing a "knockout" action which clears the bucket.

Other new features include an increase in the bucket dumping angle at all heights, an increase in the grading angle, and a vertical steel radiator guard that permits contact between the TerraTrac and a truck box or hopper frame without damaging the radiator or headlights.

For further information write to the American Tractor Co., 800 Fort Wayne St., Churubusco, Ind., or use the Request Card that is bound in at page 18 of this issue. Circle No. 97.

Motor pulleys

■ Variable speed motor pulleys with adjustable and tilting motor bases are described in a bulletin from the Worthington Corp. Also pictured and described are companion sheaves, motor bases, and V-belts. Charts list complete ratings, dimensions, and selection data for the pulleys. According to the specification chart, the pulleys are available in ⅛ to ¾ horsepower.

To obtain Bulletin No. 1630-B1 write to the Worthington Corp., Worthington and Harrison Aves, Harrison, N. J., or use the Request Card at page 18. Circle No. 71.

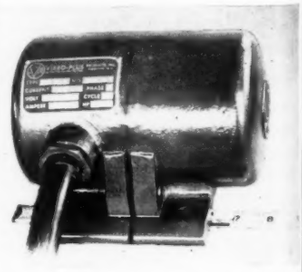
Small vibrator gives impact of 275 pounds

■ A vibrator that weighs 25 pounds and delivers an impact of 275 pounds is announced by Vibro-Plus Products, Inc. The TopDog Model ER-100 external vibrator is recommended for use in concrete casting on prestressed work pipe and tile production, block machines, and the vibrating tables.

The ER-100 can be furnished for either portable or fixed mounting. A range of voltages between 110 and 550 is available, with one, two, or three-phase current. The vibrator is said to be smaller than a standard football and to operate with no more noise than that of an electric motor.

The ER-100 is the smallest vibrator in the TopDog line. Other sizes are the ER-500 with 1,440-pound impact, the ER-300, and the ER-160.

For further information write to Vibro-Plus Products, Inc., Stanhope, N. J., or use the Request Card at page 18. Circle No. 2.



The Vibro-Plus TopDog ER-100 vibrator weighs 25 pounds and delivers an impact of 275 pounds.

The Robbins rotary drill, here mounted on the rear of a Cat D8, is reported to drill 100 feet per hour or more in average hard sandrock.

Dry-type rotary speeds drilling of blastholes

■ A tractor-mounted dry-type rotary drill said to operate at the rate of 100 feet per hour or more in average hard rock, is announced by Robbins Machine & Mfg. Co., Inc. The drill is designed for mounting on the rear of crawler tractors in the size and horsepower class of the Caterpillar D8.

The Robbins rotary drill features a mechanical drive. Power comes from the rear power takeoff of the tractor through a 4-speed transmission, a right-angle drive, and a square shaft or kelly. The square shaft powers a sliding gear box which rotates the drill steel between 20 and 120 rpm.

Down pressures as high as 30 tons on the drill bit are obtained by two 8-inch hydraulic cylinders operated by a 64-gpm hydraulic pump driven from the front power takeoff of the tractor. The pistons operate a rack and pinion that raise and lower the drill pipe by two chain sprockets, providing the necessary down pressure on the bit. Three hydraulic jacks are used to level the drill.

A 600-cfm compressor is used to remove cuttings from the hole. The Robbins drill can handle drill bits of from 5 to 10 inches.

For further information write to Robbins Machine & Mfg. Co., Inc., P. O. Box 281, Oneonta, Ala., or use the Request Card at page 18. Circle No. 105.

Clearly marked hat sizes on adjustable headgear

■ A new line of fiber glass safety hats and caps with clearly marked hat sizes on the adjustable band is available from Jackson Products, Inc. The headgear has the hammock straps and sweatband assembled in one unit with nylon cord providing the required adjustment over the top of the head.

The headband of polyethylene tenite plastic retains its strength and flexibility under extremely high and low temperatures, is low in moisture absorption, and is highly acid resistant, the manufacturer reports. The sweatband, made of lined leatherette, goes completely around the head.

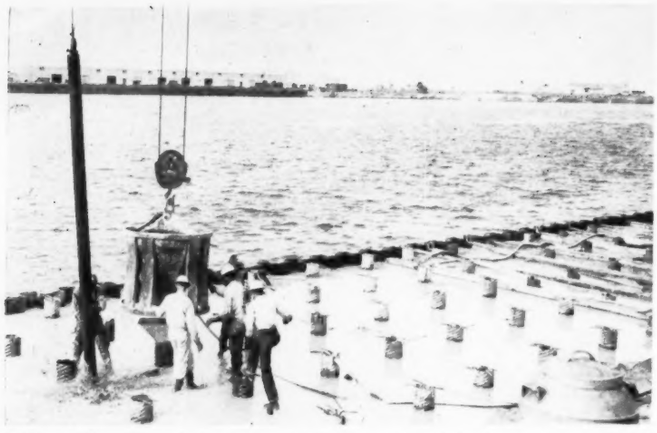
For further information write to Jackson Products, Inc., 31739 Mound Road, Warren, Mich., or use the Request Card at page 18. Circle No. 102.

The new line of Jackson safety headgear has clearly marked hat sizes on the adjustable band.

Plastic pipe catalog

■ Flexible plastic pipe and fittings, manufactured by the Triangle Conduit & Cable Co., Inc., are described in a catalog. Topics covered in the catalog are chemical resistance ratings, coil dimensions, weights, electrical properties and applications, and handling and storing of flexible plastic pipe and fittings. Data included under semi-rigid plastic pipe and fittings are physical properties, riser assemblies, thermal properties, and jet wall installation.

To obtain the catalog write to the Plastic Pipe Division, Triangle Conduit & Cable Co., Inc., Triangle and Jersey Avenues, New Brunswick, N. J., or use the Request Card at page 18. Circle No. 66.



Bailing and concrete placing goes on simultaneously. Reinforcing rods are inserted in the shells after they have been bailed out. Placement is handled by a Gar-Bro 1-yard bucket. *C&E Staff Photos*

Pneumatic mandrel set[illegible]ng, f[illegible]

Rig is used in handling and placing flexible units for foundation; floating template of steel pontoons guides the driving of sheet piles

Driving long, flexible pile shells for the foundation of the concrete waterfront section of the $3.6 million port-expansion project at Brownsville, Texas, was an operation that attracted attention. For this job was done with a pneumatic, shop-made mandrel that had four sections of hose, inflated with air to expand the rig until it made contact with the inside of the piling and deflated by vacuum so that it could be withdrawn from the shell.

The driving of 117,000 linear feet of bearing piles was only one of the uncommon methods used by Elmer C. Gardner, Inc., Houston, Texas, in completing docks 10, 11, 12, and 13 last month under a $1,644,542 contract. And this is only one of three major contracts for the port-improvement job being done by the Brownsville Navigation District of Cameron County. Construction of warehouses on the docks will be done by H. W. Balay, Mercedes, Texas. Under the third big contract, held by Bauer-Smith Dredging Co., Inc., Port Lavaca, Texas, the harbor adjacent to the dock area was enlarged by hydraulic dredging, the sand and clay being pumped to separate spoil banks so that it could be reclaimed for backfilling when Gardner finished the substructures of the dock.

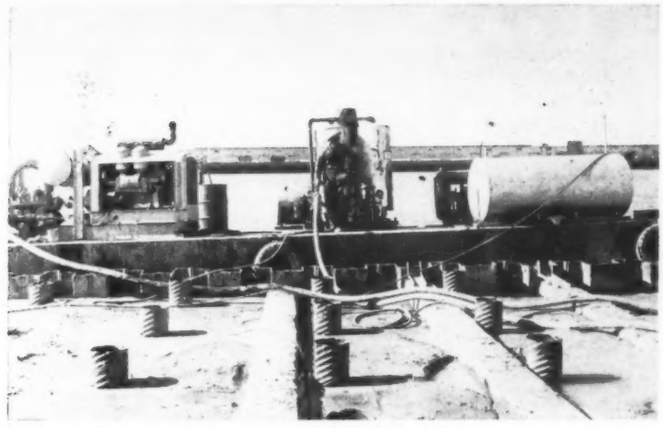
Sheet-pile bulkhead

One of Gardner's first operations was the driving of a sheet-pile bulkhead, 2,376 feet long, on the face of the dock. The 2,500 tons of MZ-38 piling for this bulkhead consisted of sections 52 to 65 feet in length which were driven almost to water level. The driving was done by a Manitowoc Model 3900 crane handling McKiernan-Terry 9-B-3 and 11-B-3 steam hammers supplied with steam by a Texstream high-speed steam generator. This 125-hp generator was capable of getting up enough steam for driving in two minutes from a cold start.

Getting the sheets down to the specified grade required some jetting. A Griffin high-pressure jetting pump powered by a GM diesel engine sent the water to the long jetting pipe that was handled from one of the lines of the crane.

Because of the natural slope of the material as excavated by the dredge, and the necessity for full navigating depth at the face of the dock, it was necessary to drive the sheet-pile bulk-

setting, thin pile shells for new dock facility



A barge accompanies the pile-driving operation, carrying a Griffin Jet pump, left, the Texsteam generator supplying steam to the driving hammer, and a Schramm compressor.

head out in the water and away from the bank. However, it was close enough to the bank so that the 120-foot boom of the Manitowoc 3900 could reach out to drive the sheeting while the machine remained on the bank.

Since it was particularly important that this bulkhead be driven to a straight and true line, a floating template was used as a guide. This template was made up of a series of rectangular steel pontoons bolted together in the shape of a wide, flat U. The two short legs of the U extended from the shore out to the long section that served as the template. Adjustable legs from the shore held the template out to the proper location, while cables, drawn tight with hand winches, anchored the rig to the bank.

These pontoons were also used to carry the steam generator and jetting pump. Later, when the bulkhead had been completed, some of the pontoon sections were rearranged into a rectangular float so that it could carry these two units and additional equipment during the remainder of the construction period.

Cranes join forces in the pile-driving operation. One handles jetting equipment and places pile shells so they can be picked up on the mandrel. Another handles mandrel and hammer, while a third bails out shells already driven.

A second row of sheeting was driven into the bank 80 feet back from the bulkhead to serve as an anchor. This row consists of 381 tons of MZ-27 sheets, 15 feet long. Two 12-inch, 30.7-pound channels were set on the back side of this row of piling for wales. The two rows are tied together at 6-foot centers with 2⅜-inch tie rods upset to 3 inches in diameter for threads. These tie rods

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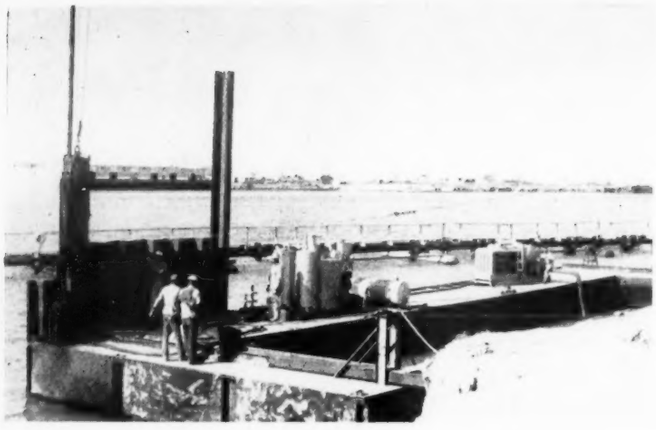


A McKiernan-Terry steam hammer drives MZ-38 sheet piles 52 to 65 feet long, for the 2,376-foot-pile bulkhead. Steam for the hammer is supplied by the Texsteam generator on the barge.
Brownsville Navigation District Photo

attach to a pair of 12-inch, 20.7-pound channels which form the wales on the front side of the bulkhead.

Use big pumps

The bulkhead also served as a cofferdam to enclose the area between it and the bank. In this 50-foot-wide and 2,300-foot-long area, the water had to be lowered to an elevation of minus 3.5 feet before backfill could be placed behind the bulkhead. To do this big dewatering job, the contractor devised some simple and inexpensive pumps that worked well for the low lift required.

Each pump consisted of an elbow of 30-inch pipe with one leg extending down into the water behind the bulkhead and the other leg projecting over the top of the bulkhead. A vertical shaft in the vertical leg of the pipe was supported on water-lubricated rubber bearings. To its lower end was attached a standard marine propeller. The upper end of the shaft of one of these pumps was attached to a 150-hp electric motor, the other was connected through a gear box to a 75-hp Continental engine.

When these two pumps had quickly unwatered the long narrow area, the gasoline-powered pump was removed. The electric pump, working alone, easily kept the water down during the remainder of the construction period.

The job of placing and compacting 120,000 yards of sand backfill in the dewatered area to bridge the grade up to about normal water level was subcontracted to Ballenger Construction Co., San Benito, Texas. Sand from the spoil banks made by the dredge was loaded into a fleet of four Euclid bottom-dumps by a dragline with a Hendrix 2-yard bucket and hauled to the dock area to be dumped beside the inner sheet-pile wall.

Another dragline with a Hendrix 3-yard bucket cast the sand over the wall into the area behind the bulkhead, where it was spread in 6-inch lifts and thoroughly compacted by a 50-ton pneumatic-tire roller and other equipment. Ballenger also had three Caterpillar D8 tractors and scrapers as well as dozers, sheepsfoot rollers, disks, and motor graders working under this subcontract.

Work above water line

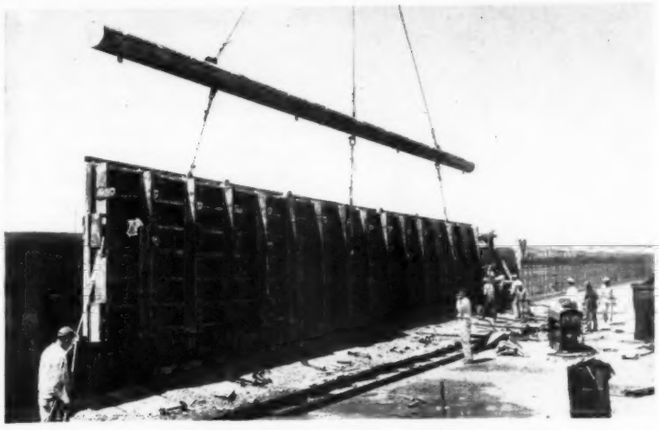
The portion of the dock above water line is a three-sided concrete box filled with compacted sand. The floor or bottom of this box—a 14-inch concrete slab called a relieving platform—is supported on a grid of bearing piles with its outer edge against the sheet-pile bulkhead.

The outer face of the box is a concrete bulkhead, 14 inches thick and 12.5 feet high, resting on the sheet-pile bulkhead. It is fitted with two lines of 12×12 creosoted timber fenders on the front face and a 12×12 creosoted timber on top. This bulkhead supports the mooring bits used to tie up ships while they are loaded or unloaded.

The relieving platform and the bulkhead are finished before 10 feet of sand fill is placed on the relieving platform slab and compacted. The third side of the box—the 18-inch deck slab of the dock that carries two marginal railroad tracks—is then placed. The fourth, or open side of the box is the vertical shoreward side.

Pneumatic mandrel handles piles

Driving bearing piles for the relieving platform was a tricky job, since the Armco 12-inch Hel-Cor tubes used, ranging from 25 to 60 feet in length, were light and more than a



An Armco 16-inch pipe pile serves as a stringback, providing three lifting points, while a 60-foot section of steel form is moved to another bulkhead pour.
C&E Staff Photo

little flexible. This job required the special mandrel, now covered by patents, that was designed and built in the contractor's shops.

The core of the 60-foot mandrel is a square steel box made of two 6×6-inch angles welded together. A length of hose, attached to each of the four flat sides of the box, runs the full length of the mandrel. Curved pieces of steel plate attached to the outside of the hoses contact the inside of a pile.

When the mandrel is inserted into a pile, the hoses are inflated with air, expanding the mandrel until the steel plates make firm contact with the inside of the pile shell. When a pile shell has been driven, the air pressure is released and a vacuum applied to the hoses. The contracted mandrel is then easily withdrawn from a pile.

To make it possible for the Manitowoc crane with 120-feet of boom to insert the 60-foot mandrel into a 60-foot pile, a series of loading wells was provided. These, consisting of 60-foot lengths of 16-inch Armco pipe piles with the bottoms capped, were driven at about 100-foot intervals in one of the regular pile positions.

The pile shells were transported from stockpiles to the driving site by a Ford F8 truck equipped with a Pitman Hydra-Lift controlled from the truck cab. One man drove the truck and operated the lift. The rig picked up a pile by one end and snaked it to the auxiliary crane, which picked up the Helcor pile shell and set it in a 16-inch pipe well. As the Manitowoc finished driving a shell, it swung over to a well and dropped the mandrel inside a pile. Then the mandrel was inflated, allowing the crane to pick the pile out of the well and swing it into driving position.

Bearing piles were driven by a Vulcan No. 1 steam hammer operating in a short set of leads suspended from one of the lines of the Manitowoc. Steam for driving was supplied by the same Texsteam generator that was used when sheet piling was driven. An auxiliary crane usually handled the jetting pipe, while water pressure was supplied by the Griffin pump.

A prefabricated cage of reinforcing steel, consisting of four No. 6 longitudinal bars with stirrups, was set in the shells after they had been driven. As soon as possible after this, the shells were filled with ready-mix concrete that was bucketed from transit mixers to piles in a Gar-Bro 1-yard bucket.

When the concrete placing and pile driving operations were being done at the same time, as many as four cranes were working in a small area. One crane set pile shells in the loading well, one crane handled driving, a third handled jetting equipment, and the fourth placed the concrete.

The 14-inch reinforced-concrete relieving platform was placed without forms, except for the necessary bulkheads at construction joints. Ready-mixed concrete was bucketed from mixers to the point of placement by Gar-Bro 2-yard buckets and vibrated by Chicago Pneumatic air-powered vibrators supplied with air by a Le Roi 500-cfm compressor.

Steel wall forms adapted

A set of heavy steel forms, originally used in dam construction, were adapted for construction of the bulkhead wall by making them into 60-foot sections, some of which weighed more than 5 tons. The face of the form was a ¼-inch plate backed with 4-inch channel studs and heavy vertical wales.

The inside form was set and supported by adjustable steel pipe braces anchored to the relieving platform. The outside or face form was set in place and tied to the inside form with 1-inch bolts. Some of these tie bolts were located so that they could also be used to attach the timber fenders to the outside of the finished wall. In these cases, the bolts were set in

A Ford F8 truck with a Pitman Hydra-Lift enables the truck driver to pick up the flexible Armco Hel-Cor pile shells and transport them from the storage site to the driving rigs.
C&E Staff Photo

2-inch pipe sleeves, allowing for some adjustment in attaching the timbers.

The heavy form sections were moved from place to place, set, and stripped by one of the cranes. Handling of the 60-foot sections was facilitated by an Armco 16-inch pipe pile, used as a spreader to provide three or more lifting points and reduce the danger of distorting the form during handling.

Concrete placement and vibration were done with equipment used on the relieving platform. Exposed surfaces were sprayed with A. C. Horn curing compound as soon as possible.

The project included nearly 7,000 square yards of 18-inch concrete paving and 39,000 square yards of 7-inch paving in addition to the placing of a 200 × 1,000-foot concrete floor. These slabs, formed with standard paving forms and finished by a conventional paving train, were placed with ready-mix concrete. Valley Ready Mix Concrete Co., Harlingen, Texas, furnished all the concrete for the Gardner job from a batching plant that it set up on the job site for the best possible service and control.

Also included in the dock contract was the construction of 16,000 linear feet of railroad track that consists of treated timber ties, with 80 and 90-pound rails, on a crushed stone ballast. This work was sublet to W. A. Smith Construction Co., Houston.

Gardner's work was started in July, 1955 and completed last month. But it is not the last of the work to be done under the port-improvement plan. The general program began with the construction of docks 5 and 9 in 1950 and since then, work has been almost continuous. Steadily increasing business at the Brownsville port indicates that the program may continue for some time in the future.

Personnel

The port-improvement program was planned by Cameron Engineering Co., Austin, Texas. R. L. Reid, Houston, was the consulting engineer, and supervision of construction is being handled by the engineering staff of the Navigation District. The project was financed by the sale of revenue bonds, which will be repaid with earnings from the port.

The superintendent on the dock work for Elmer C. Gardner, Inc., was H. D. Balentine. Gardner visited the job regularly. Assistant superintendent of the work was M. W. Boehning. Carpenter superintendent was W. C. Clutts, and labor foreman was Fred M. Wilson. Chief engineer for the Brownsville Navigation District is Ersel G. Lantz. General manager of the district is F. W. Hofmokel.

THE END

Tool resurfacer

■ With the addition of a 5-foot track extension and a Rotator, the Con-Servall is equipped to resurface rolls, idlers, sheaves, and flanges, according to a mailing piece from the Penn Tool & Machinery Co. The literature states that the manually-operated, self-locking worm and sector drive permits angular positioning of the arbor from horizontal to vertical. The entire unit is pictured, and pertinent specifications are included.

To obtain the mailing piece write to the Penn Tool & Machine Co., Danville, Ill., or use the Request Card at page 18. Circle No. 59.

Hot oil systems

■ The Merrill Process System produces any oil temperature from 150 to 600 degrees F, according to a bulletin from the Parks-Cramer Co. The hot oil heaters are designed for asphalt plants, and for all phases of tar and pitch handling, the bulletin states. A picture of the unit shows operating controls located at the side of the unit in a steel enclosure. The construction and design of the system is fully explained.

To obtain Bulletin 1255 write to the Parks-Cramer Co., Fitchburg 24, Mass., or use the Request Card at page 18. Circle No. 57.

TOWED BY A CATERPILLAR D6, a Gurries GP-50-G road plane is tested on the Gore Pass highway project in Colorado. The rig has an effective leveling length of 50 feet. It does not require a hydraulic power control unit on the towing tractor because it has a self-contained hydraulic unit. Joined to a Cat D6, the GP-50-G turns 180 degrees on a 25-foot roadbed. The bowl, an integral part of the main frame, has a capacity of approximately 4 cubic yards. For further information on the plane circle No. 110 on the Request Card at page 18, or write to the **Raymond Gurries Mfg. Co.**, 1720 S. First St., San Jose, Calif.

Post-hole digger designed for highway construction

■ A new post-hole digger, recommended for use in road and highway construction and for the installation of guardrail, is announced by the Roper Mfg. Co. The unit has a series of interchangeable digger heads designed for uses ranging from digging in soft earth to digging through permafrost, shale, and coral rock.

Features of the digger include rust-proof zinc-plated bolts, double-tandem grease seals, new turnbuckle for four-way rigid adjustment, and quick attachment to any two or three-point hitch on a tractor or a jeep.

The Roper digger quickly attaches to any two or three-point tractor or jeep hitch.

A slip clutch to eliminate shear-pin breakage and an easily attached 6-inch auger extension are available as optional equipment. The digger is guaranteed for a year and the power gears for ten years.

For further information write to the Roper Mfg. Co., Walnut Drive, Zanesville, Ohio, or use the Request Card at page 18. Circle No. 115.

A-C names managers

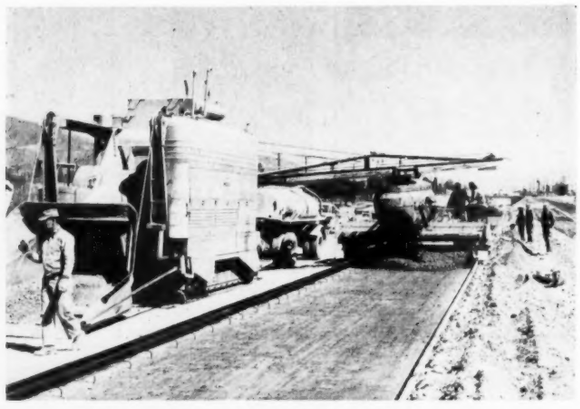
Allis-Chalmers Mfg. Co., Milwaukee, Wis., has appointed two district managers. R. H. Cline, former manager of the firm's Charlotte, N. C., district office, has been named manager of the Pittsburgh, Pa., office. He succeeds J. K. Keogh, who is the special representative reporting to V. L. Spinney, manager of the Central Region.

C. B. Rumble, Jr., succeeds Cline in the post of Charlotte district manager.

←For more facts, circle No. 256

Rented equipment and hired crews handle the entire paving job. After the compacted base has been ripped to form a windrow, and sacked cement dumped on it, a Wood Model 42 Roadmixer blends the material with cement and water.

An Allis-Chalmers tractor, pulling a drag planer, levels the windrow. Cement treatment of the base was done inside the Blaw-Knox steel forms to permit a final checking of the subbase to exact elevation.



The rented Rex dual-drum paver works outside the forms as it dumps concrete ahead of a Blaw-Knox spreader. Mixing water is supplied by the tank trailer just in front of the paver.

Depending on a specialist for curing also, J. A. Thompson & Son, Inc., had Techkote Co., Inglewood, Calif., spray Sealtex gray-pigmented curing solution onto a finished lane.

Excavating outfit makes a success of concrete paving

Contractor completes grading, clearing the way for crews hired specially for bridge construction and paving work

A contractor specializing in earthwork gave himself a leg up to more diversified work when he took on—and successfully completed—$1,500,000 worth of divided highway that included grading, the paving of 3.47 miles of four-lane portland-cement concrete pavement, and the construction of five bridges.

Three moves helped J. A. Thompson & Son, Inc., Los Angeles, Calif., put the road job near Banning, Calif., on a smooth and efficiently organized basis.

First, living up to its good reputation on earthwork, the firm tackled and completed this phase of the job quickly so that the roadway was clear for the remainder of construction.

Then special carpenter crews and supervisors were hired to construct the five relatively simple reinforced-concrete bridges included in the two California Division of Highways contracts. Four of these structures were called for in the first contract; one bridge and the roadway grading and paving were included in the other. Four of the bridges carry Banning city streets over the new freeway. One structure serves as an underpass.

Finally, Thompson rented concrete-paving equipment and hired crews to operate the spread. Concrete-batching problems were avoided when the contractor arranged for a commercial outfit—San Gorgonio Rock Products, Banning—to supply this material to state specifications.

With this setup, Thompson was able to complete grading of the roadbed, work on all structures, the 4-inch-thick cement-treated base, two 24-foot-wide strips of 8-inch-thick portland-cement concrete paving, and miscellaneous items like curbs, asphalt pavement on ramps and approaches, and catch basins.

Fast grading

Since the state highway engineers were not able to balance grading quantities—because the new thoroughfare meets many existing grades south of Banning—a major portion of the 200,000-cubic-yard unclassified grading material had to be hauled from a borrow pit located near the base of the mountains about three miles from the east end of the project. This borrow material, needed for approaches and ramps, was generally sandy. There was some gravel, two inches and smaller, in this pit, but generally the material was fine and granular and had all the loading and hauling characteristics of sand. It tendéd to flatten if it was dry and heaped up when it was damp.

Taking advantage of the latter characteristics, Thompson watered the borrow-pit material so that it would load better. Renting a main delivery line of quick-joint pipe from Kelly Pipe Co., Los Angeles, Thompson hooked it into the nearest supply of Banning water. Laterals were then run into the borrow area, where Rainbird sprinkler heads were used to water the material. Sprinkling continued 24 hours a day—from several days to a week—before the material was loaded from each area.

As a result of this trick, the eight

Contraction joints are cut at 60-foot intervals the day concrete is laid with this two-unit Jointmaster concrete saw. Intermediate joints, 15 feet apart are cut the next day.

Caterpillar DW20's assigned to hauling worked at a high rate of production. The units were push-loaded by a pair of Allis-Chalmers HD-21's that operated in tandem so that the pushing power of both machines was applied to the scrapers.

The wet, sandy material was so firm after it had been dampened that it built up into the control cables of the scrapers. According to general superintendent R. H. Kelley, many of the DW20's came out of the pit with 27-cubic-yard loads ranging well over the 40-ton weight mark.

As soon as grading started, earthmoving crews and equipment set the rapid pace that was maintained throughout the entire job. The fill material was placed in lifts from 6 to 8 inches thick and, after being leveled by dozer, it was compacted by a double sheepsfoot set of rollers and a Ferguson 50-ton pneumatic compactor. The final 0.35-foot of roadbed grade consisted of select material, obtained from the same borrow areas, and hauled in by the DW20 fleet. This better portion of material from the pits was rolled down tight to bring the grade very close to finish blue tops set by surveyors.

Grading and work on the bridge structures was completed almost simultaneously, making it possible for cement-treating and paving crews to move rapidly on the roadway. The bridge structures were built by experienced crews using conventional plywood-faced prefabbing methods, 2 x 4 studs, and wales secured by Superior form hardware.

Cement-treated base

This upper 0.35-foot of roadbed was cement-treated by the addition of 3 per cent by volume of portland cement. This operation, set up on the basis of average runs of 3,000 linear feet per 8-hour shift, was entirely mechanized. The cement-treating and portland-cement concrete-paving equipment was rented from Clyde W. Wood & Sons, North Hollywood, and E. L. Matich, Riverside, Calif.

The first machine in the cement-treating lineup, a Lewis subgrader, trimmed away the slight amount of excess material in the compacted base. Then a windrow shaper with a scarifying attachment, pulled by a Caterpillar D8 tractor, ripped into the compacted base to turn up a windrow containing 4 cubic feet of material per linear foot.

Because of high winds, bagged cement was delivered on trucks, the bags opened over the windrow, and the material dumped by hand just ahead of the Wood Model 42 Roadmixer that blended the materials. Attempts were made to use bulk cement, but the winds were simply too strong to leave the cement undisturbed.

The self-propelled Wood 42 Roadmixer blended the freshly dumped cement with subbase material and moisture in one pass. A laydown

(*Continued on next page*)

A Blaw-Knox transverse finisher follows the spreader to give the 12-foot-wide lane of concrete a smooth surface. Vibrators carried at each side of the rear of the spreader consolidated concrete along the forms.

This Lima truck crane handles the job of stripping the Blaw-Knox forms, which will be cleaned before being loaded on a truck to be moved ahead. Even the 21,000 linear feet of 8-inch forms are rented.

(Continued from preceding page)

planer, towed by an Allis-Chalmers tractor, then leveled the material. A Galion three-wheel steel roller delivered initial compaction and, after a final trimming pass by a Lewis subgrader, a Tampo self-propelled rubber-tire roller moved in for final compaction. The cement treatment was done inside the steel forms so that final checking of the subbase to exact elevation—as referred to the form lines—was possible.

Paving equipment rented too

J. A. Thompson & Son also went to Clyde Wood and the Matich organization to rent the concrete-paving equipment, including some 21,000 linear feet of Blaw-Knox 8-inch road forms. These steel sections were set by a form crew in grades established by a motor grader. On the first lane, where a double row of forms was necessary, steel longitudinal keys were used to temporarily hide the end of a ½ x 30-inch dowel bar that was used on 3-foot centers to stabilize load transfer along the longitudinal joints. The only other dowel bars were at construction joints, which were left at the end of a day's run. Plans called for 1/8 x 3-inch sawed contraction joints at 15-foot intervals.

Paving equipment in the lineup included a Rex dual-drum machine that was supplied with mixing water by a tank trailer and a Gorman-Rupp pump. The paver discharged fresh concrete in front of a Blaw-Knox spreader, which had two Viber electric vibrators mounted on each side of the rear of its frame to consolidate concrete along the forms. A Blaw-Knox transverse finisher then gave a smooth surface to the concrete.

Curing was done under a material subcontract with the Techkote Co., Inc., Inglewood, Calif., which used Sealtex gray-pigmented curing solution. A two-unit Jointmaster concrete saw, owned by Concrete Sawing Equipment Co., Inc., Arcadia sawed contraction joints at 60-foot intervals the same night. Intermediate joints were made the next day. A fleet of five-batch GMC and Cook Bros. batch trucks, also rented, transported the dry-mixed concrete from San Gorgonio Rock Products' commercial plant near Banning.

Thompson's handling of this job has been so successful that the firm need have few qualms about taking on similar jobs. The new road, separated by a 25-foot dividing strip, was completed about two months ago and now carries U. S. 70 around the southern outskirts of Banning.

THE END

Calking compounds

■ Thiokol calking and glazing compounds mixed with curing agents produce extruded-in-place rubber seals for metal, glass, stone, and plastic, according to a folder from the Thiokol Chemical Corp. The compounds are said to be unaffected by sunlight, ozone, oxygen, water, and smog. The application methods, and the physical and chemical properties of the compounds are detailed.

To obtain the folder write to the Thiokol Chemical Corp., 780 N. Clinton Ave., Trenton 7, N. J., or use the Request Card at page 18. Circle No. 67.

Seventeen changes have been incorporated in the new Worthington 34E dual-drum paver.

Improved dual-drum paver features 17 modifications

■ Seventeen major design modifications and operational features have been incorporated into the new 34E dual-drum paver by the Worthington Corp. Among the changes are an increase in engine speed and hydraulic steering brakes.

The engine speed has been upped from 1,400 to 1,800 rpm. The new hydraulically operated steering brakes, in place of the foot-operated mechanical brakes, permit the paver to be turned around within its own length, according to the manufacturer.

Other new features include a four-strand chain drive in place of the triple-strand drive, thus increasing the drive from the speed reduction unit to the countershaft; and a 700-gallon auxiliary water tank, redesigned to eliminate the possibility of welds cracking and buckling due to water surge.

The driving disks are now made in two pieces to facilitate removal. The 3-inch pump has been moved from under the skip to a position under the engine. Cartridge-type Timken bearings are now used in the bucket travel clutch and the traction drive shaft has been changed to an alloy shaft, with bronze instead of babbitt bushings.

For further information write to the Worthington Corp., Worthington and Harrison Aves., Harrison, N. J., or use the Request Card at page 18. Circle No. 8.

Twin-power scraper

■ Euclid's Model TS-18 twin-power scraper for off-highway work is detailed in a catalog from the company. The outstanding feature of the scraper is that it is available with either two engines of 218 horsepower each, to give a combined maximum rate of 436 hp, or one 218-hp engine and a 300-hp engine that combines to give 518 horsepower. Job photos show that one engine is in the tractor, the other behind the scraper bowl. According to the specifications, the scraper has a capacity of 18 yards struck, 21 yards on a 3 to 1 slope, and 24 yards on a 1 to 1 slope.

To obtain Form No. 552 write to the Euclid Division, General Motors Corp., 1361 Chardon Road, Cleveland 17, Ohio, or use the Request Card that is bound in at page 18 of this issue. Circle No. 36.

Hardsurfacing flux used in submerged arc welding

■ The Lincoln Electric Co. has announced an addition to its line of hardsurfacing agglomerated alloy fluxes. The flux, H-560, is used with the submerged arc-welding process to produce a hardsurfacing deposit with a mild steel electrode.

Recommended for use in refacing crushing rolls and rings, H-560 is an agglomerated mixture of fluxing materials and alloys which will produce a high-carbon, high-alloy weld deposit when used with Lincoln's L-60 mild steel automatic electrode wire, the manufacturer states. Alloys are added to the weld deposit through the flux.

The new flux is said to be excellent for the fabrication and maintenance of wearing parts where the service involves severe abrasion and medium impact. It will perform successfully under abrasive conditions at temperatures as high as 1,100 degrees F, the company reports.

For further information write to the Lincoln Electric Co., 22801 St. Clair Ave., Cleveland 17, Ohio, or use the Request Card at page 18. Circle No. 11.

The digging capacity of the Model 155 Trenchliner has been increased 25 per cent.

Trencher's capacity upped 25 per cent

■ An increase of 25 per cent in the digging capacity of the Model 155 general utility Trenchliner is announced by the Parsons Co. The change, which ups the rig's digging depth to 10 feet, does not change the range of digging widths of from 16 to 26 inches.

Capable of producing up to 12¾ linear feet of trench per minute, the 155 Trenchliner operates with a range of 30 digging speeds selected by lever control. By changing one sprocket, a higher range of speeds is available—a maximum of 25.17 linear fpm.

Other features of the Trenchliner include a hydraulic-actuated, telescopic boom hoist; reversible powershift conveyor; self-cleaning, tractor-type crawlers; and a range of bucket sizes fitted with Parsons reversible, self-cleaning Tap-In teeth. Either gas or diesel power is furnished with the Trenchliner.

For further information write to the Parsons Co., Box 431, Newton, Iowa, or use the Request Card at page 18. Circle No. 111.

Bucket teeth repointers crescent-shaped to fit

■ Crescent-shaped manganese repointers for bucket teeth, said to cut in half the time needed to rebuild worn teeth, are available from Industrial Overlay Metals, Inc. Bergstrom Castaloy repointers require no cutting of the worn tooth or point in order to make them fit.

The crescent-shaped weld that casts the new point to the tooth is said to eliminate stress concentrations. Also, the V formed on a cast to the shaped repointer is smaller than a cut-back tooth for fitting a wedge bar, saving approximately 50 per cent of the welding time and the welding rod, according to the manufacturer.

The shaped repointers are available in two types. On the BC type, the points are thick enough to apply a heavy bead of hard metal, prolonging the service life. The BC-G self-sharpening type has a groove across the point of the tooth, extending back along both sides. When the groove is filled with hard metal it finishes the point to standard dimensions.

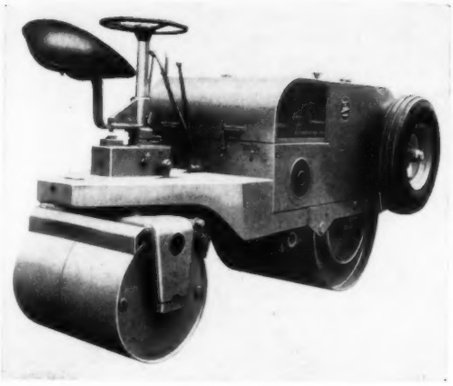
For further information write to Industrial Overlay Metals, Inc., Eaton, Ohio, or use the Request Card at page 18. Circle No. 124.

Rock drills; drill bits

■ Two bulletins from the Le Roi Division of Westinghouse Air Brake Co. describe rock drills and one-use drill bits. The tool design and construction, operator handling and care, and maintenance features of rock drills are detailed. Information is given on the lubrication system, drill and blow actions, and valve and piston design of the rock drills. Construction, specifications, and preparation of drill rod shanks for the one-use drill bits are included in the second bulletin. The preparation of drill rod shanks for the connection that joins the bit and steel is explained and illustrated. Recommended heat-treating procedures and gaging of shanks conclude the bulletin.

To obtain Bulletins No. AT111B and RD29 write to the Le Roi Division, Westinghouse Air Brake Co., 3716 W. Wisconsin Ave., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 49.

"SMOOTH AS STEAM" WITH S-5 HAMMER: 12" tubing is being driven to approx. 47' for pier bearing piles for an approach to Cincinnati's Third Street Distributor. The "powerhouse" of this operation is the Jaeger "600" rotary, at right of the driving rig. The single acting Model S-5 McKiernan-Terry hammer, with a bore of 14" and a 3¼' stroke, hits 60 blows per minute of 16,250 foot pounds when operated with Jaeger "Air-Plus" pressure.



Littleford's Model 157 tandem roller has new valves, a new clutch, and power steering.

"You and short cuts!"

Redesigned tandem roller has new clutch, steering

■ A redesigned version of the Model 157 portable tandem roller has been announced by Littleford Bros., Inc. The revamped 2 to 3-ton unit now features a Wisconsin engine with Stellite valves, a Twin Disc clutch, and power steering.

The new valves, along with non-positive valve rotators, are reported to wear more evenly and last up to three times longer than the original ones. The Twin Disc clutch is mounted on the outside for quicker accessibility. The new horizontal-type steering system offers part-time power steering for easier operation.

For more information write to Littleford Bros., Inc., 485 E. Pearl St., Cincinnati 2, Ohio, or use the Request Card at page 18. Circle No. 130.

Starting fluid effective down to minus 65 degrees

■ A starting fluid for gasoline and diesel engines, said to be effective in temperatures as low as minus 65 degrees F, is available from the Wilco Co. It is packaged in either a pressurized 12-ounce can or in a pint container used with a separate metal sprayer.

According to the manufacturer, Sure Fire starting fluid's low ether content protects engines against upper cylinder area damage and reduces engine wear by eliminating slow, hard starts in damp or cold weather. Also, the low ether content makes it safe to ship and store.

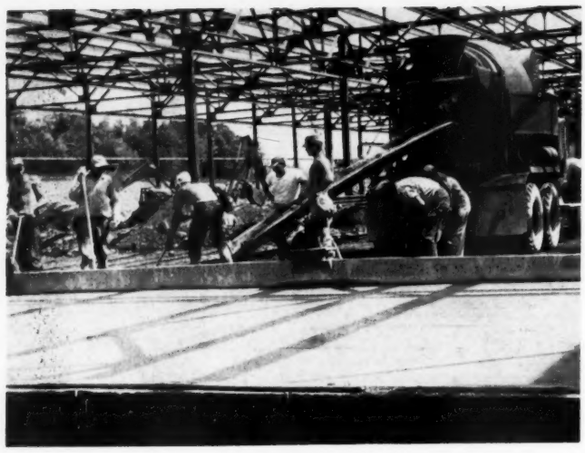
The fluid is sprayed into the intake manifold or the air intake. It can be used with a permanent injection system by pouring the fluid into the capsule reservoir.

For further information write to the Wilco Co., Industrial and Commercial Division, 4425 Bandini Blvd., Los Angeles 23, Calif., or use the Request Card at page 18. Circle No. 123.

Wico Electric changes

Wico Electric Co., West Springfield, Mass., has made two changes in its sales personnel. Angelo Introvigne will cover the Midwest from offices in Chicago, Ill. At the same time he will assist the firm's district manager Harold H. Roberts.

Clyde Moore will handle the Southwest from headquarters in Dallas, Texas. He replaces Harry Lolly, who retired.



Contractor Crow-Smith, a joint venture of William L. Crow Construction Co. and Vincent J. Smith, Inc., uses a 25-foot 5-inch Stow vibrating screed to strike off concrete for the floor slabs of the new $12 million IBM plant in Owego, N. Y. Jaeger truck mixers deliver 2-inch slump concrete.

Vibrating screeds, trowels replace hand finishing

Mechanical finishing of concrete floors, fast replacing hand-finishing methods is today producing smoother and stronger slabs more economically, particularly if the job is engineered for the use of powered vibrating screeds and troweling machines.

In screeding large floor areas, it is advisable to use long vibratory screeds, since they strike off the surface as they are pulled along, vibrate the concrete, and shape the surface at the same time.

Wherever practicable, forms should be laid out in lanes of equal width so that the same length screed can be used on all lanes. This saves a great deal of time, as fewer forms are needed. If possible, vertical columns should be placed next to the form, and in that way the screed can be easily lifted around the column. Steel forms should be put in securely to support the weight of the screed.

Concrete is poured from 15 to 20 feet ahead of the screed and raked to the approximate height of the forms. Vibration is then started up on the screed, which is pulled along by two to four men, depending on the length of the span and the stiffness of the concrete. In this way a better slab is obtained even with a stiff mix. A mix with a 1-inch slump, not always used when hand finishing is done, can be easily struck off. A stiff mix means a strong concrete, and the vibration of the screed results in a more homogeneous slab.

A vibrating screed, powered by about a 2½-hp engine mounted in the center of the beam, operates at about 5,000 vibrations per minute, with vibrations transmitted through the length of the beam directly to the concrete. The beam is supported at each end by end-roller assemblies attached to the beam by rubber mounts, which prevent vibration from being transmitted to the forms. A throttle control at one end of the beam stops or starts the screed's vibration by adjusting the speed above or below the cut-out speed of the centrifugal clutch.

When concrete is not up to the level of the forms, and leaves bare spots, the screed can be dipped up on rollers and rolled back for a second pass. It may be found that intermediate throttle settings are more desirable for particular mixes; the best setting can be found after a few passes.

The advantage of using a dry mix is that the slab sets up quicker, and

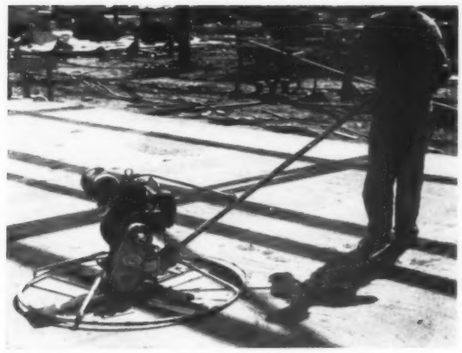
Modern methods of finishing concrete floors prove fast, economical, and result in strong slabs

troweling can start after screeding.

Machine troweling

Floating with a rotary trowel, which is 3 to 4 times faster than hand troweling, can start when the concrete has set up sufficiently to support the weight of the operator without leaving a noticeable impression. With floating blades as level as possible, the machine is guided over the surface in a circular motion.

After floating, the surface should be allowed to set until it will support the machine, which has the finishing blades attached and the pitch set at approximately ¼ inch without digging in when rotating. The surface is then finished in a similar manner to floating, with the pitch of the trowels adjusted to suit the surface conditions. Practically any degree of smoothness can be obtained by making passes and increasing the pitch as the hardness of the surface increases. THE END



The Stow G46 Roto-Trowel, a 4-bladed 46-inch machine with stationary guard, was put to work when the concrete had set up sufficiently to support the weight of the operator.

Huber-Warco motor graders in the 6-D and 7-D series are now available with Cummins diesels as well as GM diesel engines.

Add diesel-powered units to line of motor graders

■ The addition of Cummins diesel-powered units to its line of 6-D and 7-D series motor graders with torque converter combined with full power shift transmission has been announced by the Huber-Warco Co. The new models are the 6-D2, powered by a 125-hp JN-6-BI Cummins, and the 7-D2, powered by a 150-hp JBIS-600 Cummins diesel. The new models are similar to the 6-D and 7-D which carry GM diesels.

As with the GM-diesel-powered models, the new rig features a power-sliding moldboard, operated hydraulically from the cab. This arrangement permits the operator to power-shift the moldboard out of the way when a culvert or post is approached and then power-shift it back to its exact former position, without leaving the cab or even slowing up.

Other features include an all-welded frame with high-arched design that is said to give more space for blade movement and better visibility of the blade area, an extra-heavy front axle with the steering knuckle made from heat-treated steel forging, a heavy-duty final drive with all gears and shafts forged off heat-treated steel, interchangeable hydraulic cylinder components, and (on the 7-D series) 4-wheel brakes.

For further information write to the Huber-Warco Co., 202 N. Greenwood St., Marion, Ohio, or use the Request Card at page 18. Circle No. 90.

Wood framing fasteners available in nine types

■ Nine different shapes of steel fasteners for reinforcing wood framing joints are available from the Columbus Engineering Co. According to the manufacturer, with Timbergrip fasteners the nails act in shear instead of pull.

The Timbergrip fasteners are one-piece wrap-around units that permit speedier construction and offer more strength over other types of fasteners, the manufacturer states. They are available in 16 or 20-gage galvanized steel. The 16-gage fasteners have an ultimate tensile strength of 6,130 pounds and can withstand a shear force of 4,350 pounds. The 20-gage fasteners have an ultimate tensile strength of 3,800 pounds and can withstand a shear force of 3,800 pounds.

Other advantages reported for the fasteners include the fact that they require only one man to place, they will not slip while being nailed, they eliminate toe-nailing and notching, and they have multi-grip action.

For further information write to the Columbus Engineering Co., a division of the Habco Mfg. Co., Columbus, Nebr., or use the Request Card at page 18. Circle No. 128.

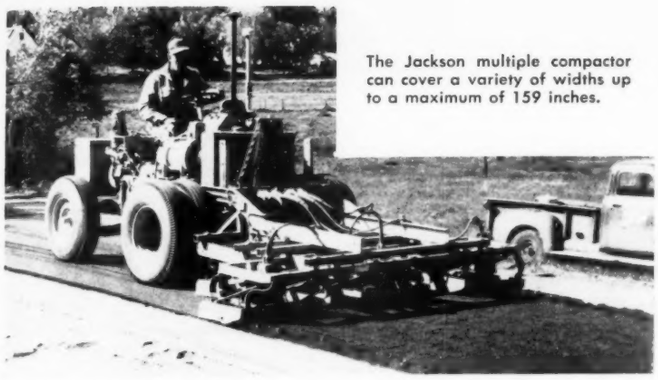
Turbine pumps

■ Water and oil-lubricated vertical turbine pumps are described in bulletins from Layne & Bowler, Inc. A diagrammatic picture of each pump points out the construction and design features of the unit. Application data and information on pump and special drive heads is included in the bulletins.

To obtain the bulletins write to Layne & Bowler, Inc., 1993 Chelsea Ave., Memphis 8, Tenn., or use the Request Card at page 18. Circle No. 51.

Baker-Raulang appoints

Robert J. Laws is the new assistant chief engineer of the Baker-Raulang Co., Cleveland, Ohio, manufacturer of material handling trucks. A member of the Cleveland Engineering Society, Laws came to Baker-Raulang after 15 years active duty with the U. S. Marine Corps.



The Jackson multiple compactor can cover a variety of widths up to a maximum of 159 inches.

Multiple-head compactor allows several set-ups

■ A multiple compactor with six units in the workhead that can be arranged to provide the most efficient coverage and consolidation of granular soils, rock, slag, sand, or gravel is available from Jackson Vibrators, Inc.

Each of the six units in the workhead operates independently. The maximum working width of the machine, with the compactor units side by side, is 13 feet, 3 inches. Smaller width can be covered by elminating one or more of the units or by staggering them in two rows. The units can also be fitted with operating handles and used as manually guided tampers on inaccessible areas.

According to the manufacturer, each of the six units in the workhead of the multiple compactor delivers up to 4,200 blows per minute with a force of 2 tons.

For further information write to Jackson Vibrators, Inc., Ludington, Mich., or use the Request Card at page 18. Circle No. 93.

Two generating plants operate at 1,800 rpm

■ Two direct-drive generating plants, both designed to operate at 1,800 rpm, have been added to the line of engine-generators manufactured by the Wincharger Corp. Both units are driven by Briggs & Stratton engines.

The Winco Series 2B23S4D is rated at 2,000 watts, with plenty of intermittent overload capacity, according to the manufacturer. The 102B14S4D is rated at 1,250 watts and also has a wide margin for temporary overload.

Both series are available with manual or remote-control starting, and can be equipped with a 2-wheeled dolly or a carrying cradle.

For further information write to the Wincharger Corp., P. O. Box 1168, Sioux City, Iowa, or use the Request Card that is bound in at page 18. Circle No. 125.

Ryerson opens new plant

Joseph T. Ryerson & Son, Inc., Chicago, Ill., opened an addition to its plant at 203 Westside Ave., Jersey City, N. J. The new steel service plant, occupying 355,000 square feet, provides space for warehousing, processing, and shipping of steel. Sheathed in stainless steel, the plant has two spans measuring 110×605 feet, and 85×580 feet.

Explosives' gelatin core makes it more effective

■ A new type of stripping and quarrying explosive, which is said to combine the power and efficiency of fixed high explosives with the economy of low-order blasting agents, is announced by the Atlas Powder Co. Called Amocore, the explosive consists of a basic cartridge charge of Amocol, Atlas' ammonium nitrate blasting agent, with a gelatin core.

The gelatin core, which runs throughout the length of the cartridge, appears to promote the development of full ingredient strength, the manufacturer reports. This fact is evidenced by a reduction of red fumes usually visible during ammonium nitrate blasts. Red fumes indicate incomplete detonation.

Like conventional ammonium nitrate blasting agents, Amocore must be detonated with a high explosive primer. However, the continuous gelatin initiator eliminates the need for intermediate high explosive booster charges in order to maintain detonation.

For further information write to the Atlas Powder Co., Concord Pike and New Murphy Road, Wilmington 99, Del., or use the Request Card at page 18. Circle No. 127.

avoid legal pitfalls

Municipality waived right to terminate contract

THE PROBLEM: *A New Hampshire contract to lay 5.3 miles of water mains for a municipality called for completion within 150 days after July 1. About 23,396 feet had been laid when work was suspended in December. When the job had not been resumed by April 10, the municipality notified the contractor that the contract was terminated. That weather conditions had justified the suspension of work was not denied. Termination of the contract was based on a three-fold claim: that the contractor had abandoned the work; that the supervising engineers had certified that the work had been unnecessarily and unreasonably delayed; and that the contractor, a corporation, had been dissolved. Did the municipality waive the right to terminate the contract, relet the unfinished work, and hold the contractor liable for the resulting increase in the cost of the work in excess of the contract price?*

THE ANSWER: Yes. (Plymouth Village Fire District v. New Amsterdam Casualty Co., 130 Fed. Supp. 798, decided by the United States District Court, District of New Hampshire.)

The court rejected the municipality's contention that dissolution of the contracting corporation afforded grounds for cancellation of the contract because the stockholders of the firm had voted to continue corporate existence in order to complete the contract. The court said that any right to cancel that the municipality might have had was waived by making payments for work performed and by otherwise recognizing the continued existence of the contract. When the 150-day limit for completing the job had expired, the municipality lost any right to cancel the contract on that ground by permitting the contractor to proceed.

Particularly notable is the court's reason for disregarding the certificate of the supervising engineers as grounds for terminating the contract. There was a clause in the contract to the effect that the supervising engineers' decision concerning the contractor's fulfillment of its obligation should be "final and conclusive". But this clause, the court said, made the engineers arbiters of factual controversies arising during performance, and made their decision on essential facts binding. However, the clause gave the engineers no power to decide questions of law, such as that involved here, of whether the municipality had legal grounds for ending the contract or whether that right had been waived.

The court decided that the contractor was entitled to collect the reasonable value of work performed.

Oral pledge does not bind contractor to wage rise

THE PROBLEM: *A paving subcontract was made according to the prevailing union-wage rate. A few days after work started, the union threatened to strike unless the wage was increased by 20 cents an hour. Without cancelling the subcontract and making a new one, the prime contractor orally promised to pay half of the increased wage cost. Was the promise binding?*

THE ANSWER: No. (Arzani v. People, 149 N. Y. Supp. 2d 38, decided by the New York Supreme Court, Onondaga County.) The case is subject to review and possible reversal by a higher court.

The court applied a generally recognized rule of law that, because there must be a "consideration" for a binding promise, a promise to pay another party more than he is entitled to under an existing contract is not binding unless the promisee agrees to do something he is not already bound to do. But the parties could have agreed to cancel the contract and make a new one calling for a higher price based on the increased wage schedule. The court said that "from the standpoint of ordinary business morality, the situation of the promisor contractor may well be less defensible than that of the" subcontractor.

Power of owner's attorney to authorize contract

THE PROBLEM: *A contractor's bid on a government job was conditioned upon right to additional pay if 48 hours' work were required weekly. The contract specified that the government would not be liable if a 48-hour week were required by executive order. Attorneys, in the absence of the contracting officer, assured the contractor that qualifications in the contract would protect him against overtime payment. Was the contractor entitled to rely on such assurance?*

THE ANSWER: Yes. (George H. Whike Construction Co. v. United States, 140 Fed. Supp. 560, decided by the United States Court of Claims.)

The court, through four of the five judges who heard the case, reasoned that the contractor reasonably assumed, under the facts of the case, that the attorneys were authorized to give the assurance they did. Otherwise, the government, figuratively

From Hoop Skirts . . . . .to

The first successful wire making enterprise in America was started in 1831 at Worcester, Massachusetts, and became known as Washburn and Moen. This firm produced wire for the woolen industry, for screws and nails and piano wire.

The first big boom in wire making came through a whim in fashion—the hoop skirt—and Washburn and Moen took full advantage of it. They became the leading wire producer in the nation and won a reputation for quality which they never relinquished.

In 1899, during the era of big mergers, Washburn and Moen, along with many other wire making plants, were incorporated into the American Steel and Wire Company of New Jersey, which soon became a part of the United States Steel Corporation.

A few years later, American Steel & Wire began to manufacture wire rope at Trenton, New Jersey and New Haven, Connecticut. This product was highly successful. Production expanded . . . and today American Steel and Wire is the largest producer of wire rope in the world, making more than 1,000 kinds and sizes.

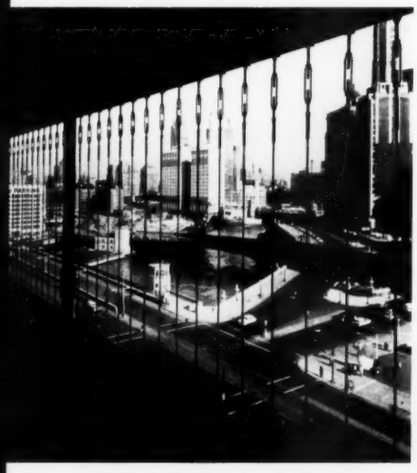
Your closest contact with wire rope may be a daily ride in an elevator. You see it supporting the biggest suspension bridges, and digging coal on mammoth shovels. It is used on the deepest oil wells, on ships and steel mill cranes, for highway guard rails and logging cables. Wire rope and strand are the universal tools for pulling, hauling and transporting man, his goods and materials. Write for our book on Tiger Brand Wire Rope.

AMERICAN STEEL & WIRE DIVISION,
UNITED STATES STEEL CORPORATION, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN TIGER BRAND WIRE ROPE

Excellity Preformed



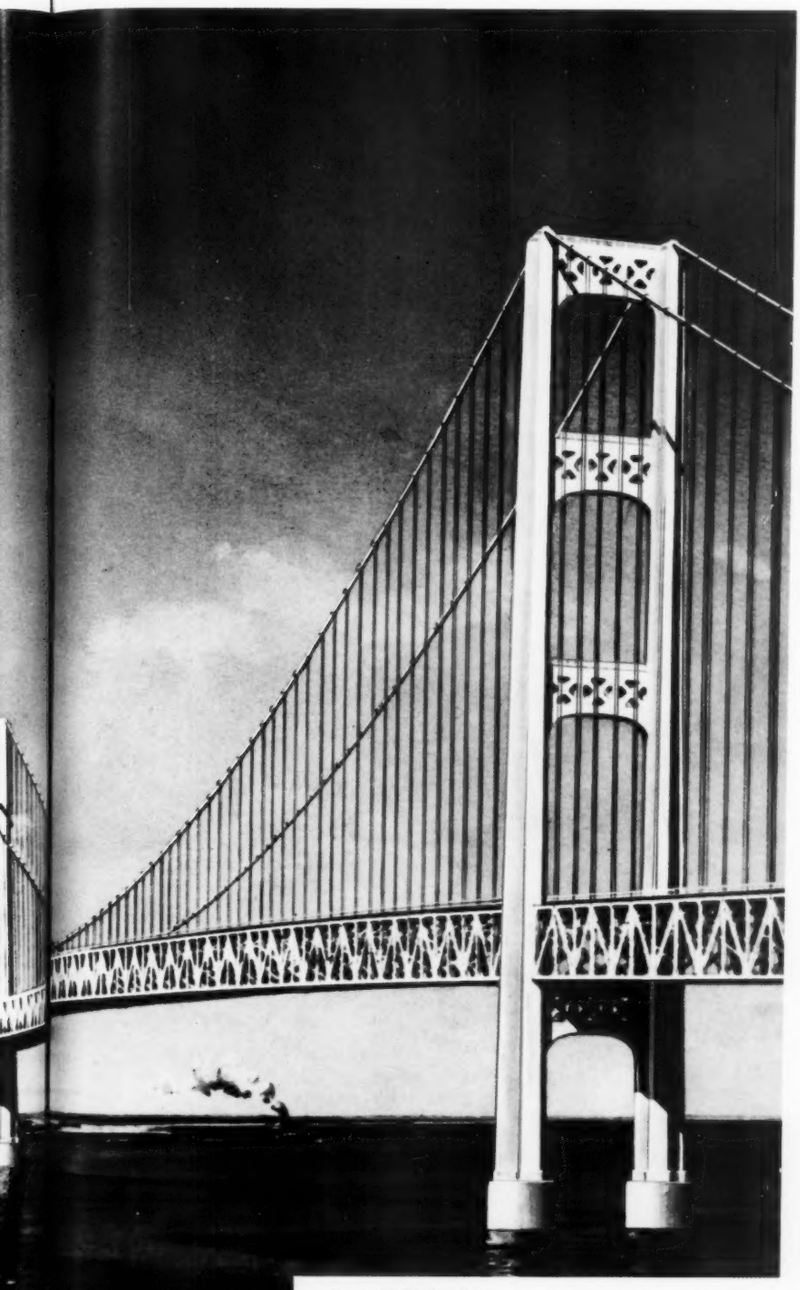
Wall of Stainless Steel Strand
Tiger Brand in one of Chicago's new parking garages. American Steel & Wire springs provide the 1,000-lb. tension to keep the strand taut.

Drilling for Oil in the Gulf of Mexico with a new type of rig equipped with 5,000 feet of Tiger Brand Drilling Line.

USS

UNITED STATES STEEL

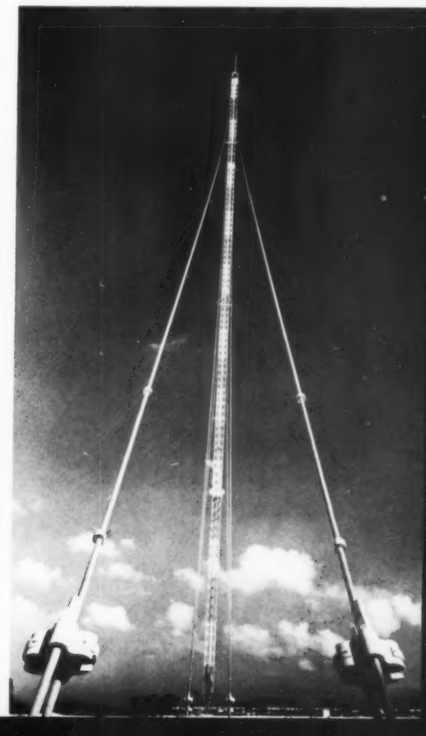
Suspension Bridges



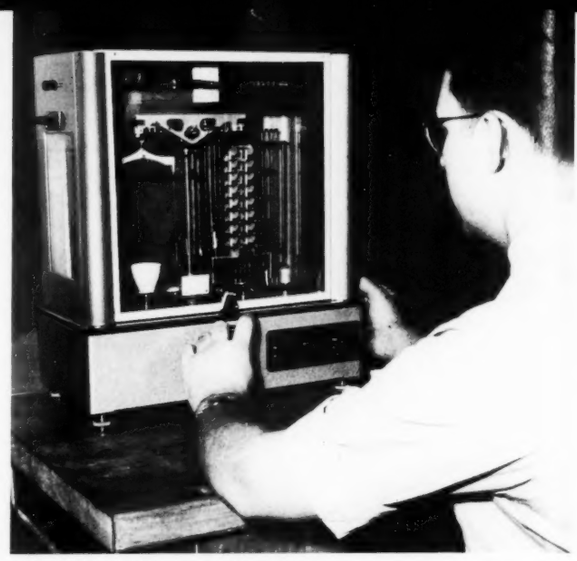
Over 45,000 miles of wire products by American Steel & Wire will be used to complete the Mackinac bridge at St. Ignace, Michigan—longest suspension bridge in the world.

World's Largest Shovel scoops up 60 cubic yards in one bite. Tiger Brand Wire Rope provides the steel "muscles" that make it work.

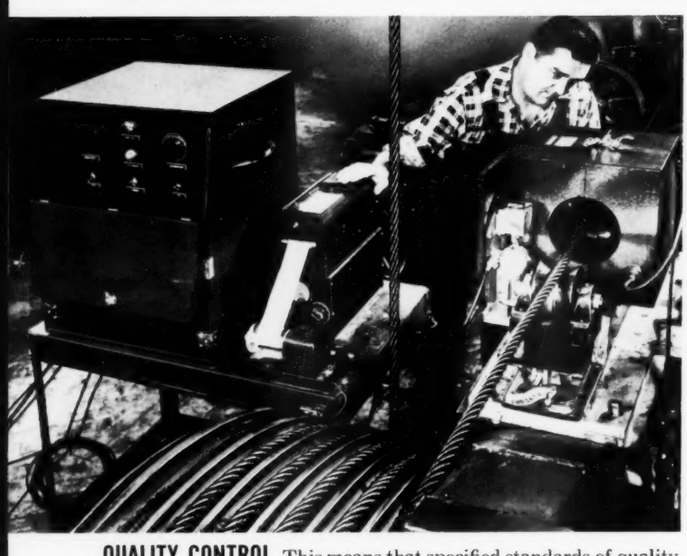
Tall TV Tower for station WGBS-TV in Miami, Florida, must withstand high winds. It is supported by 1⅜" Tiger Brand galvanized strand.



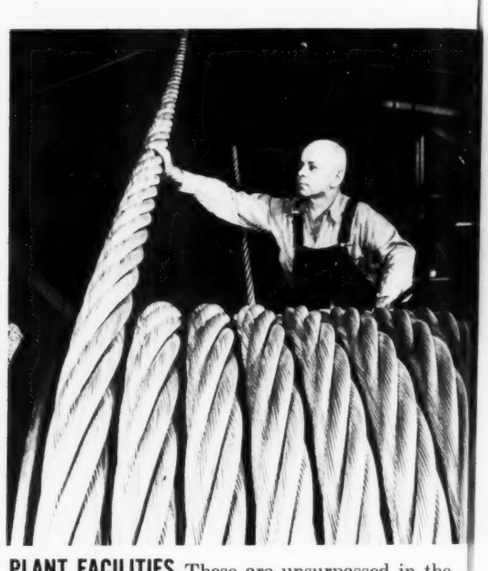
Why Tiger Brand leads . . .



RESEARCH AND ENGINEERING American Steel and Wire has built up one of the finest staffs of wire rope engineers in the country, and in addition can draw from any of the basic research being performed by the United States Steel Corporation. In practice, this means that Tiger Brand Wire Rope is made from the best materials and finest steel being produced. The rope construction is engineered to fit the job . . . and you get a rope that will give the most service at the least cost.



QUALITY CONTROL This means that specified standards of quality are maintained for every step of production from ore to finished product. You can be sure of getting the same high-quality wire rope time after time. The illustration shows an electronic inspection machine, exclusive with American Steel & Wire, that detects if a wire rope imperfection exists, records it on a chart and marks the spot on the rope.



PLANT FACILITIES These are unsurpassed in the industry. American Steel & Wire can make any type and size of wire rope and strand up to the large 4-inch pre-stressed suspension ropes shown here. These ropes are being used on the Pennsylvania-New Jersey Turnpike bridge.

USS AMERICAN TIGER BRAND WIRE ROPE

UNITED STATES STEEL

USS

speaking, would be luring an unwary contractor into a trap. However, the fifth judge, in a dissenting opinion, reasoned that the contractor waived the condition of its bid by entering into a contract that, in effect, eliminated the condition.

Independent subcontractor

THE PROBLEM: *A contractor laying conduits engaged a cement finisher to replace sidewalks. Their agreement could be terminated should the finisher's work be unsatisfactory. The contractor agreed to make payments to the finisher and concrete suppliers, who had told the contractor that they would look to him for payment. The finisher quit the job after partly performing it, and the contractor completed it at a loss. Was the finisher an independent subcontractor, not an employee of the contractor, affecting the right of the concrete suppliers to hold the contractor liable for concrete previously supplied to him?*

THE ANSWER: Yes. (McKenzie v. Neale Construction Co., 294 Pac. 2d 355, decided by the Wyoming Supreme Court.)

The court said that the contractor had merely made himself guarantor for the payment to the suppliers of half what he should owe the subcontractor if he complied with his agreement.

Contractor is liable for negligent use of roller

THE PROBLEM: *Without warning motorists, the operator of a road roller backed the unit toward the crest of a hill into a lane of oncoming traffic. In order to avoid colliding with the roller, a motorist swerved to the left and struck pedestrians standing nearby. Were the contractor and the operator of the roller liable to the pedestrians?*

THE ANSWER: Yes. (State Contracting & Stone Co. v. Fulkerson, 288 S. W. 2d 43, decided by the Kentucky Court of Appeals.)

The court said that a jury was warranted in deciding that the direct cause of the accident was the hazardous backing of the roller, without warning to approaching traffic, and was not the neglect of the motorist to sound his horn, lessen his speed, or maintain a lookout as he approached the crest of the hill.

Injured worker is denied workmen's compensation

THE PROBLEM: *Allegedly, irritation and infection of an employee's legs were caused by his standing in wet cement. Could he collect benefits under the Georgia workmen's compensation act on a theory of occupational disease?*

THE ANSWER: No. (Nowell v. Employers Mutual Liability Insurance Co., 91 S. E. 2d 389, decided by the Georgia Court of Appeals.)

The decision rested upon testimony of experts that, an analysis of cement showed that it did not contain poisonous substances within the meaning of the Georgia law.

Picketing was illegal

THE PROBLEM: *Only a few employees of a subcontractor on a construction project in North Dakota were labor unionists, and unions picketed the site in an effort to force adoption of a union shop. Could the state courts enjoin the picketing, regardless of whether or not the employees wanted a union shop?*

THE ANSWER: Yes. (Minor v. Building & Construction Trades Council, 75 N. W. 2d 139, decided by the North Dakota Supreme Court.)

The court said that the federal Labor Management Relations Act forbids a closed shop and strictly regulates the conditions under which union-shop agreements may be consummated. But in states where compulsory union shop is outlawed, as in North Dakota, the right to determine the legality of such picketing is left open by the law.

Bridge contractor bore repair cost

THE PROBLEM: *In constructing an arched-concrete bridge over a parkway, a contractor agreed to keep the parkway open to traffic and to assume all risks of the bridge until its acceptance by the state. The plans originally called for steel beams to support the falsework, which would have permitted a clear span over the highway. Because of a shortage, steel beams could not be obtained, and timber beams were substituted. An agreement authorizing the change stipulated that the support be in the center. An automobile struck the pier, damaging the bridge. Was the state liable to the contractor for repair expenses?*

THE ANSWER: (Garofano Construction Co. v. State of New York, 134 N. Y. Supp. 2d 749, decided by the New York Court of Claims.)

(Continued on next page)

Edited by A. L. H. STREET
Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

avoid legal pitfalls

The court rejected the contractor's argument that the state was liable because it refused to reroute traffic to offset the hazard caused by the center pier, even after the contractor had pointed it out. The court noted that the contractor had agreed to modification of the contract requiring the use of the pier without insisting upon any modification of the obligation to maintain traffic on the parkway.

Shoring of trench was negligently omitted

THE PROBLEMS: *A subcontractor excavated a foundation trench 12 feet deep. The top of the embankment extended about 4 feet beyond the edge of the trench when the job was completed. Later, an employee of the general contractor was injured while working in the trench, when the embankment collapsed. The collapse was caused by neglect to shore or brace the excavation, as required by New York statutory regulation. (1) Did the fact that the injury occurred 15 days after the excavation had been completed relieve the subcontractor from liability? (2) Who was liable to injured employee, the contractor or the subcontractor?*

THE ANSWERS: (1) No. (2) The subcontractor. (Rufo v. Orlando, 130 N. E. 2d 887, decided by the New York Court of Appeals.)

The court reasoned: the fact that the subcontractor was not in possession of the trench when the accident occurred was not decisive against his being liable. "As a contractor, he was aware that an embankment over a trench negligently excavated would collapse."

Violation of a regulation adopted by the Board of Standards and Appeals under the Labor Law was equivalent to a violation of the law itself.

On the facts of the case, the excavating contractor was an independent contractor and not a mere agent or employee of the general contractor. He furnished the equipment, employed the workers on the excavation, and paid all bills.

County not liable for accident on private road

THE PROBLEM: *A California statute makes the state, counties, and municipalities liable for negligent operation of their motor vehicles on "highways". A county employee negligently permitted the blade of a bulldozer to drop on a road that was blocked off and not open to public travel. The dropping blade injured the plaintiff. Did the statute apply?*

THE ANSWER: No. (Behling v. County of Los Angeles, 294 Pac. 2d 534, decided by the California District Court of Appeal, Second District—Los Angeles.)

The court decided that the bulldozer was a "motor vehicle", within the meaning of the statute, but that the scene of the accident was not a "highway".

Subcontractor's rights on void prime contract

THE PROBLEM: *A state building contract had been partially performed when it was annulled by court decision because of irregularity in the bidding. This, in turn, invalidated a subcontract which also had been partially performed, and the subcontractor could not collect under it. Could the subcontractor require the prime contractor to pay him the difference between the value of labor and materials furnished and the amount of payments received by the subcontractor?*

THE ANSWER: Yes. (M. Ahern Co. v. John Bowen Co., Inc., 133 N. E. 2d 484, decided by the Massachusetts Supreme Judicial Court.)

The decision was affected by the fact that there was no clause in the subcontract to the effect that the subcontractor would be paid only if the prime contractor should be paid by the commonwealth. Then too, the invalidity of the prime contractor's bid, even if submitted in good faith, rendered the prime contract void. The subcontractor was in no way at fault.

Leased crane buckles

THE PROBLEM: *The lessor of a crane and its operator knew that the unit was to be used by the lessee in raising a 25,000-pound, 5-foot-diameter, 120-foot-high smokestack. A chart showed that the crane should be able to raise that load; but it buckled and caused the stack to fall and be destroyed. Was the lessor liable for the damage?*

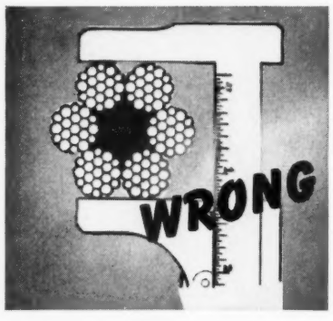
THE ANSWER: Yes. (Price Boiler & Welding Co. v. Gordon, 138 Fed Supp. 43, decided by the United States District Court, Eastern District of Michigan.)

The decision rested upon proof that the lessee had not misinformed the lessor as to the nature of the job to be done. Either the lessor had failed to inform its employee, the operator of the crane, as to the weight of the stack, or the operator was negligent in not investigating the ability of the crane to raise it.

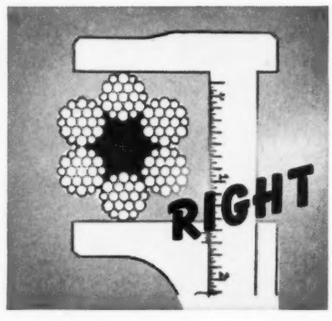
The annual production of concrete block has increased 400 per cent in a little over 20 years, according to a report of the National Concrete Masonry Association.

Tuffy® Tips

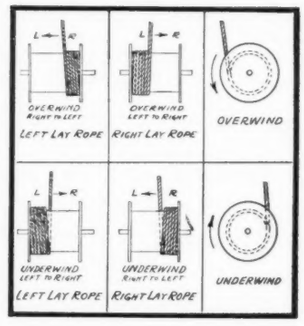
If Present Rope Is Correct Size, Measure with a Caliper



Measuring the Wrong Diameter is a common mistake that some buyers make when they order replacement rope. When the rope arrives, it turns out to be too small—even though a machinist's caliper was used to assure accuracy. It's an easy mistake to make, but it's just as easy to remember the *right* way and be sure you get the right size rope. Otherwise both the safety factor and service life of the rope will be reduced.

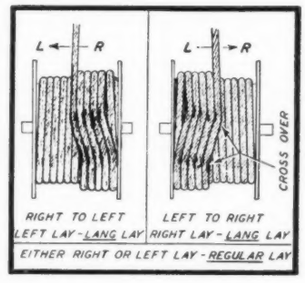


Measuring the Right Diameter is the simple step shown above. Measure so that a single strand is on each of the adjustable edges of the caliper—*not* two strands that measure as a flat side. The actual diameter of a wire rope is the same as that of the circle required to circumscribe it. The diameter of a wire rope is an important factor in determining the safe working load to be handled by your equipment.



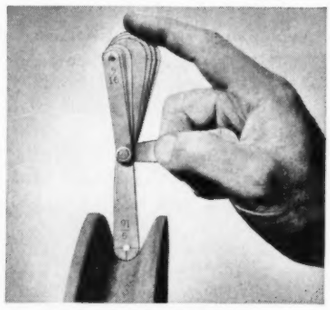
Rope Lay for One Layer Winding

These diagrams show when it is best to use right lay or left lay rope on one-layer winding. The direction of winding is determined by standing behind the drum, looking toward the direction of the rope travel.



How To Measure Groove Diameter

Shown above is the WRONG way to measure the groove diameter. The result—shorter life of the wire rope you buy. Note that only the sides of the rope will bear on the sheave. In a relatively short time this will squeeze the rope out of round and set up destructive friction and stresses on the rope strands and wires. New rope is oversize and diameter of grooves on sheaves and drums should be slightly larger.



Shown above is the *CORRECT* way to measure the groove diameter. It is a simple thing to do and will give the rope you buy a chance to deliver all the service it possibly can. Remember a wire rope is composed of many closely correlated working parts and sheave grooves which are too large or too small throw them out of alignment. Just like any other working part on a machine, wire rope cannot do its best if it is misfitted.

Rope for Two Or More Layer Winding

When a rope winds on the first layer across the face of a drum, it usually travels in a uniform pattern. But when it reaches the flange of the drum, the rope rides on the last strand of the first layer for one turn. Then, it slips into the grooves between each course of rope on the first layer. To move across the drum in this manner, the rope actually winds *back* a turn in each revolution. Then it must jump across *two* grooves in the first layer. This always occurs on the even-numbered layers, and often causes crushing. This abuse is minimized by use of properly designed grooves, spacers and lifters.

Speaker for mobile radio has transistor amplifier

■ A mobile communications speaker with a built-in transistor amplifier is announced by Motorola Communications & Electronics, Inc. The Power Voice speaker is said to provide up to 10 times the audio output of standard passive speakers in mobile two-way radio installations.

The speaker element has a bandpass frequency response designed especially for mobile service, the manufacturer reports. It accents voice frequencies but suppresses ignition noises and other interferences above and below the basic voice frequency range.

The transistor amplifier utilizes two Motorola power transistors and has a flat response of from 300 to 3,000 cps.

Motorola's Power Voice speaker, with built-in transistor amplifier can be easily removed from its inside mounting bracket and hung on the vehicle window to allow remote monitoring.

The 3.2-ohm input impedance is compatible with most communications-type receivers. Battery drain is less than 0.3 amp on standby and 1.0 amp with full voice output.

Hardware for firewall or under-dash mounting is included with the speaker. An optional kit is available for mounting on the steering column. The unit is easily removed from its mounting bracket so that it may be hung on the outside of the vehicle window to permit monitoring of incoming messages from a distance.

For further information write to Technical Information Center, Motorola Communications & Electronics, Inc., 4501 W. Augusta Blvd., Chicago 51, Ill., or use the Request Card at page 18. Circle No. 107.

Special hardware locks uneven foundation forms

■ Multi-level foundation forming problems can be solved by means of step hardware available from Simplex Forms System, Inc. The hardware is for use with Simplex form panels.

Each set of hardware consists of four lever plates, two inside levers, two outside levers, four hook plates, and eight special capscrews for assembling the plates and levers. Where the form hardware does not match due to different levels, a lever plate is nailed to one panel in line with the hook on the panel leading into it. The lever is attached to the plate and locks over the tie wire in the usual way.

Hook plates are required infrequently, according to the manufacturer, because steps can usually be arranged to require just the lever plates. When the hook plates are used, the panel must either be notched to receive the tie wire or a ¼-inch gap must be left between panels.

For further information write to Simplex Forms System, Inc., 2500 N. Main St., Rockford, Ill., or use the Request Card at page 18. Circle No. 126.

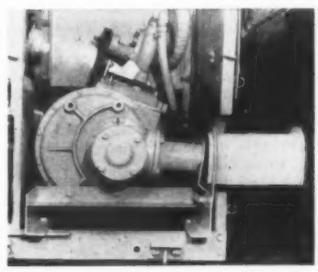
Front-end power takeoff added to truck mixers

■ A two-speed right angle gear drive for front power takeoff and power-tower mid-transmission for Worthington truck mixers has been announced by the company. The new design incorporates a pair of multiple-disk clutches, running in oil, for 2-speed operation that enables drivers to change from drum-mixing speed to agitating speed without shifting gears.

According to the manufacturer, one of the major advantages is the interchangeability of parts between the right angle gear drive and the standard-type transmission.

The Worthington front-end power takeoff permits drum motion at all times, whether stationary or declutched. Drum rotation is stopped by shifting the cab control to neutral or by utilizing the remote control on the transmission.

For further information write to the Worthington Corp., Worthington and Harrison Aves, Harrison, N. J., or use the Request Card at page 18. Circle No. 106.



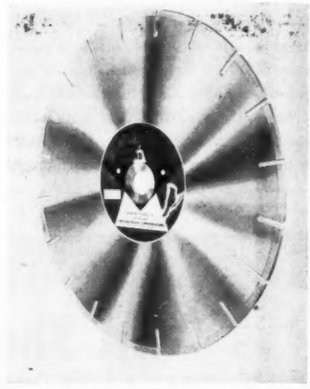
The 2-speed right-angle gear drive directly connected to a Worthington Hi-Up standard heavy-duty transmission.

EQUIPPED WITH ASSORTED MASONRY BLADES for sale and rent, this mobile saw-repairing unit is helping contractors in the Detroit, Mich., metropolitan area to eliminate downtime caused by snapped masonry blades and power-saw breakdowns. In emergencies, a call to the main office of Frederic B. Stevens, Inc., Detroit, is enough to have the field unit dispatched to the job by Western Electric radio telephone. A call to the contractor gives the serviceman information on the problem even before the unit reaches the site. If blade repair is to be time-consuming, the contractor can rent one of the saws carried by the truck until his own saw is ready to go back on the job.

All-purpose diamond blade cuts hard, soft materials

■ A tungsten carbide diamond cutting blade that is recommended for such hard and soft masonry materials as brick, tile, refractory block, and concrete is announced by the Cardinal Engineering Corp. The blade is known as the S-200V multi-purpose masonry blade.

Fourteen inches in diameter, the S-200V is said to exceed the performance and wear of comparative blades costing up to 20 per cent more. It is scientifically tensioned at the factory to assure perfect accuracy of cut, the manufacturer advises.



The Cardinal S-200V diamond cutting multi-purpose masonry blade measures 14 inches in diameter.

The S-200V blade is reportedly suited to the needs of the contractor who requires a single blade to handle a variety of masonry- cutting jobs. It has maximum diamond concentration along the cutting edge and is made with a high retention process so that diamonds are retained for a longer cutting life.

For further information write to the Cardinal Engineering Corp., 144 Burnside St., Philadelphia 27, Pa., or use the Request Card at page 18. Circle No. 12.

Bulldozer, angle dozer

■ The Shawnee bulldozer, available for Ford, Ferguson, and John Deere 40 tractors, and the angle dozer are described in a bulletin from the Shawnee Mfg. Co. The bulldozer features a hydraulically operated 5 foot 6-inch-wide blade. The angle dozer, also for mounting on John Deere 40-U and 40-S tractors, has a moldboard length 6 feet long and 15 inches high, according to the bulletin.

To obtain Bulletin 54-AB write to the Shawnee Mfg. Co., Inc., 1947 N. Topeka, Topeka, Kans., or use the Request Card at page 18. Circle No. 65.

Caterpillar acquires firm

The Englehart Mfg. Co. of Davenport, Iowa, has been acquired by Caterpillar Tractor Co., Peoria, Ill. Englehart, a major supplier of parts for Caterpillar, will be operated as a wholly owned subsidiary of Caterpillar. No major changes of organization or operations are contemplated, and Englehart will operate under its present name.

The Model PE-1, an electrically operated unit, is one of four in the Ohio Cable Car line of swing stage traction hoists.

Line of hoists features safety at high altitudes

■ A line of swing stage traction hoists that incorporate three positive load brakes said to make high altitude work easier, safer, and less costly, is available from Ohio Hoist & Mfg. Co., Inc. The line of Cable Car hoists includes a hand unit, two electric rigs, and a pneumatic model.

A self-actuating pawl, which engages the bull gear and must be manually disengaged to lower the unit, and a built-in, self-actuated safety cable stop that operates independently are incorporated in all Ohio Cable Car models. In addition, the hand-operated Model H-1 has a disk clutch, cam-actuated brake on the pinion shaft and handle which automatically unlocks when the handle is cranked in either direction and locks in the up or down position when the handle is stopped.

The electrically-operated Models PE-1 and PE-2 have a 180 and 1 worm gear ratio and an electric motor brake in place of the disk clutch. They also have an enclosed, weatherproof motor switch that automatically shuts off when it is released, and an enclosed motor with a Micro-Limit switch.

The pneumatic Model PA-1 is identical with the electric units except for its power source.

For further information write to Ohio Hoist & Mfg. Co., Inc., 2157 Euclid Ave., Cleveland 15, Ohio, or use the Request Card at page 18. Circle No. 73.

Metal Products Described

■ The principal products manufactured by the Colorado Fuel & Iron Corp. are reviewed in a catalog from the firm. Products described are semi-finished and hot-rolled steel, wire and wire products, Wickwire rope, and conveying equipment. Information on screens, springs and formed wires, processing belts, and other items for the construction industry complete the catalog. Each item is pictured and briefly described.

To obtain the catalog write to the Colorado Fuel & Iron Corp., Box 1920, Denver 1, Colo., or use the Request Card at page 18. Circle No. 30.

Automatic control keeps blade at any set slope

■ An automatic blade control, designed for the Cat No. 12 motor grader, that keeps the grader blade at any desired slope regardless of the unevenness of the terrain, has been developed by Preco Inc. The blade control, according to the manufacturer, is capable of controlling slopes to within ⅛ inch in 10 feet.

The operator of a motor grader equipped with the blade control selects the desired slope on a dial located near the other controls. The dial is calibrated in both per cent of slope and slope ratio. The operator raises or lowers the blade as required to control the depth of cut, but the slope remains as selected regardless of how the grader frame is affected by surface conditions, the manufacturer reports.

Operating controls for the Preco automatic blade control are located near the motor grader's control levers. The blade control can be overridden or shut off by the operator at any time.

Any horizontal blade angle needed for normal grading work can be used by the operator, and the slope position will be held to the indicated setting by the automatic control. The control can be overridden by the operator, or shut off to permit manual operation. It is powered by the standard battery.

For further information write to Preco Inc., 6300 E. Slauson Ave., Los Angeles 22, Calif., or use the Request Card at page 18. Circle No. 19.

Heli-Coil Corp. is sold

The assets of the Heli-Coil Corp., Danbury, Conn., have been acquired by Topp Industries, Inc., Los Angeles, Calif. Topp is an electronics and manufacturing firm; Heli-Coil manufactures a screw thread insert. The Heli-Coil Corp. was acquired in a transaction involving more than $2 million.

Working on a section that had been graded under a previous contract, Pidgeon uses a Hyster grid roller pulled by a Caterpillar DW10 to get 95 per cent Proctor in the top 3 inches of subgrade. *C&E Staff Photos*

Thruway slab over granular base built

Base and 9-inch thick pavement for 26-mile section push superhighway farther across southern Ontario

Construction of 26 miles of pavement between Windsor and Tilbury, Ont., marked another step toward completion of a beautiful thruway across the southern tip of this great Canadian province.

Portions of this divided highway, designated King's Highway No. 401, are already in use. Every year, finances permitting, additional sections are constructed on a pay-as-you-go basis. During the work, access is controlled so that the highway may be converted to full freeway status by the addition of grade structures and interchanges in the future.

Built on a 300-foot right-of-way, the highway has two 23-foot concrete roadways separated by a 30-foot depressed median. Included in the median are 3-foot inside shoulders for both roadways. The 10-foot outside shoulders, consisting of stabilized gravel, have flat shoulder slopes, wide ditches, and gentle backslopes.

The 9-inch plain concrete highway rests on 9 inches of compacted granular base. This consists of two courses. a 5-inch "B" course of pit-run gravel topped by a 4-inch "A" course of crushed gravel. The base is finished to a 29-foot width to provide for shoulders.

Compact subgrade and base

The section between Tilbury and Windsor was divided into four general contracts, each of which was handled by an Ontario firm. Sections 6 to 8 miles long were handled by Cart Paving Co., Toronto; Huron Construction Co., Blenheim; Rayner Construction, Ltd., Toronto; and Keystone Contractors, Ltd., Windsor.

On this 26-mile section, 23½ miles had previously been graded under a program extending from 1950 through 1953, leaving only 2½ miles of new grading to be done. The first operation on the bulk of the jobs involved scarifying, reshaping, and compacting the top 3 inches of the subgrade before the base material was placed.

Typical of this first operation was the work done under the Rayner contract. Two Caterpillar No. 12 motor graders scarified the graded section and reshaped it to true line and grade, then sheepsfoot rollers compacted the top 3 inches of the subgrade to make it meet the minimum requirement of 95 per cent modified Proctor density. After a final shaping by the motor graders, the subgrade was rolled by

...built on a pay-as-you-go basis

Material needed to finish a shoulder is picked up by a Cat No. 10 scraper with a pushing assist from a Galion Model 101 motor grader. This work was done by Keystone Contractors, Ltd., Windsor, one of five firms on this 26-mile job.

a Bros 13-wheel Wobble-Wheel roller.

Pit-run gravel was then hauled to the roadway and spread to make up the first or "B" course of the base. Dump trucks brought this material to a Jersey spreader pushed by an Allis-Chalmers HD-19 tractor. Enough material was laid so that, after compaction, the course was 5 inches thick. Compaction was obtained by the Bros Wobble-Wheel, which was pulled by a John Deere track-type tractor.

When the "B" course was finished to proper grade, width, and density, the "A" course was put down. This material, consisting of crushed gravel with a maximum size of 7/8 inch, was spread, rolled, and compacted in the same manner as the first base course. The specifications requirements for a density of 100 per cent were met without difficulty once the proper moisture was in the material.

Subgrade preparation and base construction were sublet on two of the jobs. Cart Paving Co. sublet the grading and base work to Marentette Bros., Ltd., Windsor, and Huron Construction Co. sublet the earthwork items to F. Pidgeon & Sons, Ltd., Chatham, Ont. These contractors used slightly different techniques and machines to obtain the same general results.

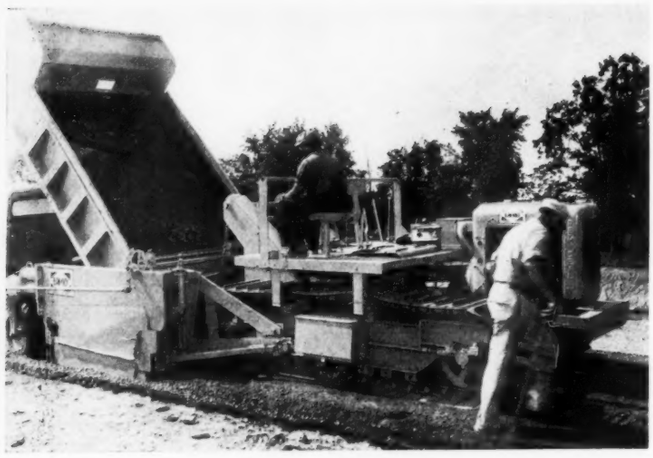
Pidgeon had two new pieces of equipment that appeared to do their respective jobs very well. One was a Hyster grid roller that compacted both the subgrade and base courses. A Caterpillar DW10 tractor towed the grid roller at a relatively high speed in a very effective compaction operation.

This contractor also used a Blaw-Knox Model 150 spreader to lay out the base material on the roadway. This self-propelled track-type spreader did this job rapidly and accurately.

Complete new paving train

Huron Construction Co., with about 7 miles of the double 23-foot roadway to construct, started the job with a completely new train of paving equipment, from forms to joint saw. The road equipment included 8,000 linear feet of Blaw-Knox 9-inch steel paving forms, a scratch template, Cleveland form tamper, Blaw-Knox finisher, Koehring longitudinal float, Blaw-Knox spreader and vibrator,

(*Continued on next page*)



◄ F. Pidgeon & Sons, Ltd., Chatham, Ont., subcontractor on the base for one section, uses a Blaw-Knox Model 150-self-propelled spreader to put down base-course material.

A Jersey spreader, pushed by an Allis-Chalmers HD-19 tractor, receives pit-run gravel from a GMC dump truck during work on the 5-inch "B" base course. This will be compacted to 95 per cent Proctor before the final 4-inch course is placed. *C&E Staff Photos*

(Continued from preceding page)

Blaw-Knox precision subgrader, and a MultiFoote 34-E dual-drum paver. Two new Clipper ConSawMatic self-propelled concrete saws were used to cut the joints.

Huron also had a new layout at the batch plant. This included a Blaw-Knox cement plant set up beside a railroad siding and equipped with undertrack hopper and screw conveyor to take the cement directly from hopper-bottom cars to the plant elevator. A three-compartment Blaw-Knox aggregate bin was fitted with a Barber-Greene conveyor system which handled the aggregates from hopper-bottom gondola cars on the siding to the bins.

The crushed gravel and crushed rock aggregates were supplied in two sizes, the maximum sizes of each being ¾ and 1½ inches, respectively. The fine aggregate was a natural sand. Vinsol resin air-entraining agent was added to increase the durability of the 3,000-psi mix. The concrete was covered as soon as possible after placing and was cured for a minimum of 72 hours with burlap and water.

Each roadway was laid in two 11½-foot-wide strips so that there was no center joint to cut or form. Transverse joints were sawed by the Clipper saws with abrasive blades. Joints were cut at 60-foot intervals as soon as it was possible to saw without damaging the material adjacent to the joint. Additional joints were sawed at 20-foot intervals when time permitted. All transverse joints in the 9-inch slab were sawed 2¼ inches deep and filled with a rubber-asphalt joint sealer, applied hot.

When both lanes of paving had been completed, the contractors built up the shoulders with stabilized gravel treated with calcium chloride.

Personnel

This project, planned and supervised by the Ontario Department of Highways, was located in Division 1 of the Ontario Highway Department. G. U. Howell, the district engineer for this division, had general super-

Final compaction of the first base-course lift is done by a Bros 13-wheel Wobble Wheel roller pulled by a John Deere tractor. The base was finished to a 29-foot width to provide for shoulders.

vision of the entire project. Project engineer on the job was J. R. Turner, who was assisted in the over-all supervision by Bruce Ray and Stuart Wrightson, supervisors of inspectors.

Superintendent for Cart Paving Co. was R. R. Crawford. For Huron Construction Co. the superintendent was Duke Monroe. The earthwork subcontract on this section was supervised by Garland Pidgeon of F. Pidgeon & Sons, Ltd. The Rayner Construction, Ltd., contract was done under the supervision of George Hamilton. Keystone Contractors, Ltd., was represented on the job by superintendent G. Rorai.

THE END

Announce three new types of bronze welding rods

■ Three extruded, heavy-coated, bronze, oxyacetylene welding rods, recommended for braze welding and the welding of malleable iron, cast iron, brass, and bronze with dirty, oily, or greasy surfaces, are announced by the Air Reduction Sales Co. According to the manufacturer, the coating on the rods cannot be knocked off in normal use.

Available are the Airco No. 20 bronze rod for general braze welding, the Airco No. 22 manganese bronze rod for high-strength welds, and the Airco No. 27 low-fuming bronze rod. The rods are made in four diameters: 1/8, 3/16, and 1/4-inch (36 inches long), and 3/32-inch (18 inches long). They are also available with a dipped coating for clean production work.

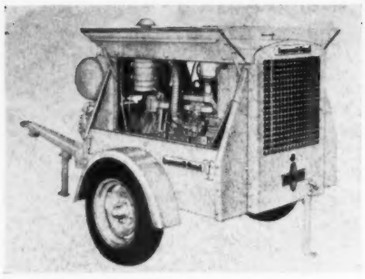
For further information write to the Air Reduction Sales Co., A division of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y., or use the Request Card at page 18. Circle No. 103.

Armco to build Atlanta plant

Construction has started on a $500,000 steel fabricating plant in Atlanta, Ga., for Armco Drainage & Metal Products, Inc., Middletown, Ohio. Located on a 52-acre site, the new plant will have a 60,000-square-foot production space to be used as a warehouse and for production of corrugated metal pipe and pipe arches, and gasoline and fuel oil bulk storage tanks.

Warren S. Mann will direct operations and J. A. Callaway will be superintendent of the new plant.

"So much for the forty pound impact. . . ."



Addition of an 85-cfm portable rotary compressor to the I-R Gyro-Flo line brings the number of sizes available to six.

Add 85-cfm unit to line of rotary compressors

■ Ingersoll-Rand has announced the addition of an 85-cfm unit to its line of Gyro-Flo portable rotary compressors. The line is now available in six sizes ranging from 85 through 900 cfm.

The Gyro-Flo 85 weighs 1,840 pounds wheel-mounted and 1,375 pounds stripped. The wheeled unit is equipped with tool boxes, fenders, and 2-wheel, spring-mounted running gear. For truck mounting, the compressor stands 42 inches high.

The new rotary is driven by a Continental F-140 4-cylinder, 4-cycle gasoline engine of L-head design and featuring individual porting. It is equipped with a push-button starter and uses a 6-volt battery system. One large fan cools both the engine and the compressor.

For further information write to the Ingersoll-Rand Co., 11 Broadway New York 4, N. Y., or use the Request Card at page 18. Circle No. 129.

Utility wheel winch fits four-wheel-drive loaders

■ A new wheel winch developed by Termac is recommended as a general utility tool for contractors engaged in general construction. The Model TOW 1 outboard winch fits four-wheel-drive bucket loaders and has a capacity of 165 feet of ¾-inch cable or 350 feet of ½-inch cable.

The Termac Model TOW 1 outboard winch fits the front wheel of four-wheel-drive bucket loaders.

Four bolts secure the winch to the front wheel of a loader. The unit is operated with the drive shaft to the rear wheels disconnected and the front wheels raised off the ground. The loader's clutch, throttle, and brakes also operate the winch.

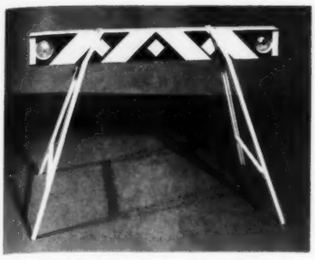
When not being used for winching, the cables are removed from the open-top cable guides in the bucket end sheets, wound onto the drum, and secured with the hook retained by tension spring.

For further information write to Termac, P. O. Box 556, Libertyville, Ill., or use the Request Card at page 18. Circle No. 9.

Blacktop sealer

■ A sealer for use on blacktop roads, highways, and streets is described in a bulletin from the Gilbreth Co. Applied by spray, the sealer covers an area from 800 to 1,200 square feet per gallon, depending on the surface texture of the blacktop, and dries in less than 10 hours, according to the bulletin. The bonding action of the sealer is said to create a protective shell that will withstand the deteriorating effects of sunlight, oxidation, water, frost, acids, and alkalies.

To obtain Bulletin T-43 write to The Gilbreth Co., 1211 Chestnut St., Philadelphia 7, Pa., or use the Request Card at page 18. Circle No. 39.



The flashing lights on the Owl-Lite barricade are visible at a distance of 2,500 feet.

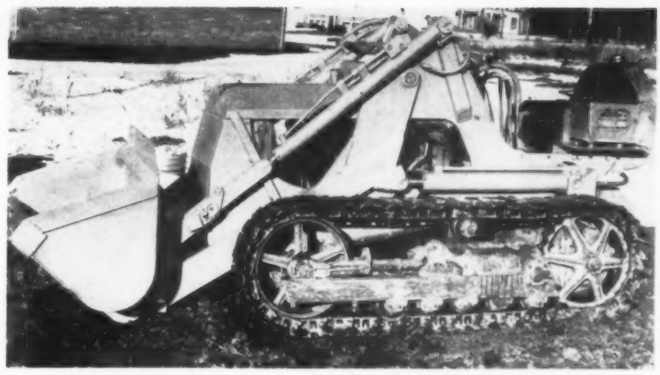
Barricade gives warning in any kind of weather

■ A warning barricade that is said to be visible in bad weather as well as in good, and at night and during the day is available from Partronics, Inc. The Owl-Lite barricade reportedly gives a three-stage warning at night.

The blinking Owl-Lite is visible to motorists at a distance of 2,500 feet. At between 500 and 700 feet, Scotchlite markings on the barricade are reflected by the motorist's headlights. At 300 feet, the barricade itself is visible in the beams of the headlights.

The barricade is reported to meet all traffic-control safety standards. It is finished in diagonal black and yellow stripes. Other colors can be obtained to meet individual state specifications.

For further information write to Partronics, Inc., 175 Great Arrow Ave., Buffalo 7, N. Y., or use the Request Card at page 18. Circle No. 20.



The improved Model TL-21 bucket loader, made by Teale & Co. of Omaha, Nebr., has increased lifting action.

Bucket loader features increased lifting power

■ The new model of the TL-21 loader will lift a heaped, ⅞-yard bucket to its maximum 9 feet 10 inches (at bucket-hinge points) in about six seconds, according to the manufacturer, Teale & Co. The loader is designed for use on the long, non-oscillating-track Caterpillar D2.

The heavy-duty Ram-Fill bucket rolls back 40 degrees at ground level. The rolling action, coupled with 8,500 pounds of power, assures fast, smooth breakaway, the manufacturer reports. In addition, the rolling action permits the machine to dig 9 inches below ground level.

For further information write to Teale & Co., P. O. Box 308, Omaha, Neb., or use the Request Card at page 18. Circle No. 84.

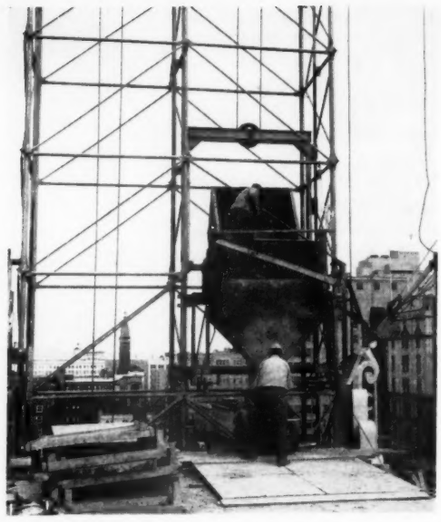
Mixermobile appoints two

Mixermobile Mfg. Inc., Portland, Oreg., has appointed two district representatives. Glyn White will cover all of southern California, and the states of Arizona, Colorado, Utah, and Nevada. His headquarters will be 3159 Abella, La Crescenta, Calif.

Ted Henry, working from the firm's home office in Portland, will handle Canada except British Columbia.

Flat-plate slab floors formed simply in new office building

Reinforced slabs are supported by shoring and filler strip while prefabricated form panels are stripped for re-use



A transfer hopper on the floor being constructed provides temporary surge storage for concrete. Jackson concrete carts loaded at the hopper are pushed over prefabricated wooden runways to the point of placement.

A simple system of constructing flat-plate slab floors and concrete columns is being used on the Petroleum Club Building, the 15-story office structure now jutting its way into the Denver skyline. Located at 110 16th St. in the downtown section of the city, the building is being constructed for Oil Building Corp., Denver, by N. G. Petry Construction Co., also of Denver.

When it is finished later this year, the structure will be one of the most modern in the city, the white metal skin over the columns contrasting with gray-blue spandrels and aluminum sash. The exterior surface will consist of a metal skin with a baked-on finish, backed up by masonry walls.

Supporting panels

Whenever possible, Petry standardized on the use of Uni-Form patented prefabbed panels to shape the concrete slabs and walls of the structure, which is built around an integral core housing elevators, a stairway, and service areas. Uni-Forms were even used to form the flat slabs between columns. Most of the reinforced-concrete columns were 32 inches square. A few 34-inch round columns were constructed with Sonotube paper forms.

Petry's method of supporting the 2×4 Uni-Form panels for the flat slab floors was first to erect 4×4 vertical timbers, spaced 8 feet apart, for shoring purposes. These were capped with a 4×6-inch girt, which supported an end of each Uni-Form panel. Midway between each set of 4×4's with their 4×6 girts was a 6×6 upright, capped by a piece of 4×6.

This member was built up with 2×6 support pieces nailed to it to support the opposite end of each Uni-Form panel. A small filler strip was then nailed between the ends of the Uni-Form panels to form a base for the concrete at that point. During a pour, the system gave vertical support to every 4 feet of slab.

This method of support made it possible for the forms to be stripped and re-used while the 6×6 timbers remained in place on 8-foot centers, holding the filler strip tight against the concrete. Panels were stripped by carpenters, who knocked out the 4×6 girts, permitting the panel units to slide to one side for stripping.

Approximately 6,000 square feet of wall forms was used for each story of the core section. These walls are heavily loaded with reinforcing steel; the structure contains about 230 pounds of reinforcing per cubic yard of concrete, and the ratio of steel to concrete in the core walls is considerably higher. This steel, and the electrical duct work that had to be provided inside the concrete slabs, made this section of the structure one of the most difficult for concrete crews to construct. Even though reinforcing-steel crews and electricians completed their

As a workman dumps concrete over reinforcing steel on one of the upper floors, another man waits to consolidate the material with a Viber electric vibrator.

work so that concrete was placed without too much difficulty, four different pours had to be made for each story, and the average construction time per story came to about two weeks.

Use truck-mixed concrete

Ready-Mixed Concrete Co., Denver, a commercial firm with a plant on the outskirts of the city, supplied concrete in Challenge truck mixers. Concrete was hoisted up the 200-foot-high Archer double-well heavy duty tower by an O. K. three-drum hoist powered by a Hercules engine. A communication system between the floor where concrete was being placed and the bottom of the platform, where a signalman was stationed, eliminated confusion during this phase of the work and kept concrete production at a rate of about 30 cubic yards per hour.

Six Jackson hauling units, pushed over prefabricated runways, were used to place the concrete. Consolidation was done with Viber electric vibrators and some Master vibrators with built-in heads. Floor surfaces were steel-troweled to prepare them for final flooring with either asphalt tile or terrazzo. The concrete mix developed the 5,000 psi strength in the columns and the 3,000-psi strength in the floors after 28 days, as required.

Heavy foundation

The new building rests on a heavy foundation, designed by the foundation firm of Woodward, Clyde & Associates, Denver. When the work started, Petry used his own crews and equipment for the extensive protection required on all four sides of the 125 × 100-foot building, but subcontracted excavation work to James B. Kenney, Denver. One side of the property butted up against the old Harris Hotel, and Petry had to underpin the hotel foundation to a depth of 16 feet to protect the structure. A sheet pile protective wall was built around the other three sides of the site to protect the streets carrying heavy downtown traffic.

The wall, requiring about 150 tons of piling, was driven by a crane with a portable set of leads. Piling was driven to a depth of about 30 feet by a McKiernan-Terry 9-B-3 pile hammer supplied with air by two Chicago Pneumatic 500-cfm compressors. About 40 tons of bracing was also required for protection.

Excavation was done under the Kenney subcontract by a shovel that was rigged as a dragline for part of this work. An Allis-Chalmers HD-5G tractor with a Tractomotive front-end loader kept the area around the shovel clean, and also excavated material against the sheet pile wall and in hard-to-get-at corners.

Excavation was carried down about two-thirds of the total distance before

(*Continued on next page*)

A 2 x 4 Uni-Form panel is removed quickly by two carpenters after timbers supporting the panels have been removed. Half the shores, 6 x 6 timbers on 8-foot centers, remain in place to support the slab.

(Continued from preceding page)

the heavy foundation, consisting of 47 drilled-in-place caissons, was constructed. The caissons, not belled, consist of 15 units that are 3 feet in diameter, 25 that are 4 feet in diameter, and 7 that have a diameter of 4.5 feet. This design was made after studies indicated that the caissons should be drilled in place through the sand and gravel overburden and from 5 to 7 feet down in the heavy blue shale parent rock that is about 1,500 feet thick at the site. After the caissons had been drilled and reinforcing steel placed, concrete was placed to the top elevation of the caissons.

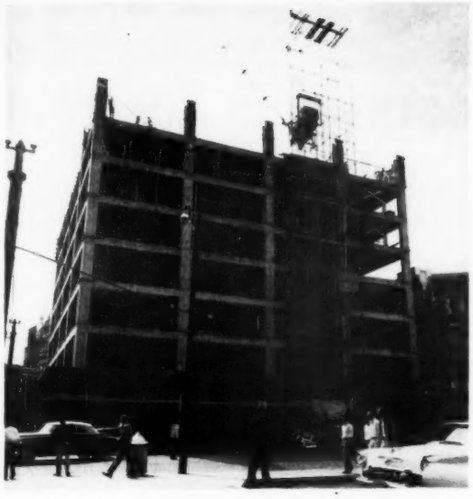
Two air-conditioning wells, and a 1,600-foot-deep water-supply well were also drilled while excavation stood at this level. The former wells will furnish and discharge water for the structure's air conditioning system. The latter well, drilled by a rotary-type rig used in the oil industry, will provide the building with its own water supply. With this work done, the remainder of the 30-foot excavation was completed and bracing installed around the sheet-pile cell.

Building features

All but four of the floors will be leased to petroleum companies for office use. The basement and first floor have been reserved by Columbia Savings & Loan Association of Denver, and the 12th and 13th floors will be used by the Petroleum Club, a group made up of members of the oil industry and employees working in the building's offices.

One of the features of the building is the air conditioning and heating system that is tailored to the dry climate of the Denver area. Units, located at every other window and controlling the temperature in each office, will be fed by chilled water and hot water pipes from the central system in the subbasement of the building. There is also a central duct system serving the central area of the building, and a duct system that supplies air drawn into the units located at every other window. Trane air-handling units are located on each floor of the building.

Of the building's seven elevators, four are for passengers and one is the principal freight elevator. Two supplementary freight elevators will serve the bank area and the club area. These are Otis installations equipped



The new Petroleum Club Building in Denver rises to half its height as concrete placing continues. Concrete, delivered from a commercial plant by Challenge truck mixers, is hoisted to upper floors in the 200-foot-high Archer tower.

TO ASSURE THE ADHERENCE of corrosion and electrical resistant wraps on steel pipe being used for a natural gas line in Brooklyn, N. Y., the contractor is coating the exposed areas where the 40-foot pipe sections are joined with Pliobond, the all-purpose adhesive made by the Chemical Division of the Goodyear Tire & Rubber Co. Except for the ends, the pipe sections are wrapped prior to installation. After the sections are welded, the exposed weld areas are wirebrushed and cleaned. The Pliobond is then applied and the protective wrapping is tightly wound over the coated area, completing the insulation job. When completed, the 17½-mile natural gas line will supply residents in Queens, N. Y. More than 1,150 lengths of the 26-inch-diameter steel pipe were laid up to August of this year; the remainder will be placed next year. For more information about Pliobond write to the **Chemical Division, Goodyear Tire & Rubber Co.**, Akron 16, Ohio, or use the Request Card at page 18. Circle No. 185.

with the latest operator-less elevator features.

Personnel

The architectural design of the structure was worked out under the supervision of Charles D. Strong, architect; Norman Todd, structural engineer; Len Rollins, mechanical engineer, and Gordon White, special architect for the Petroleum Club. The Bank Building Equipment Corp. of America, of St. Louis, Mo., also cooperated on the design of banking facilities on the first floor and in the basement.

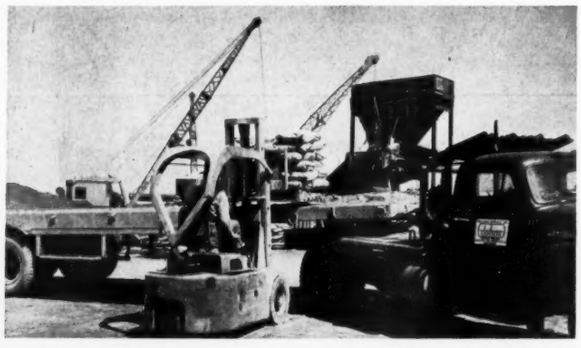
All field operations for the contractor are under the general supervision of C. E. Walter, general superintendent, assisted by Clyde Nance, assistant superintendent; E. G. Schmidt, labor foreman; C. W. Kerlee, carpenter foreman, and L. J. Vahling, steel foreman. THE END

Do you need information on equipment? If so, circle the appropriate number on the card at page 18 and drop it in the mail.

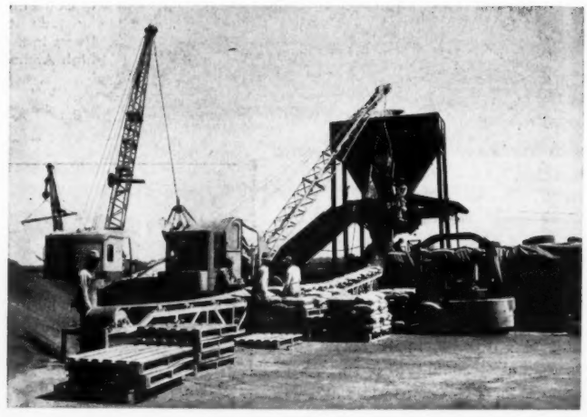
Pipe encased in concrete for underwater gas line

C&E Staff Photos

1. A length of pipe is lost in a cloud of smoke as it gets a coat of dope and a double wrapping of Johns-Manville felt and Blue Flag glass fiber. Hot dope is supplied by the Littleford kettle, rear, and air for the burners and other equipment is furnished by the Ingersoll-Rand 125-cfm compressor, foreground. From here, the pipe rolls by gravity to temporary storage to wait a turn at the Wate-Kote plant.



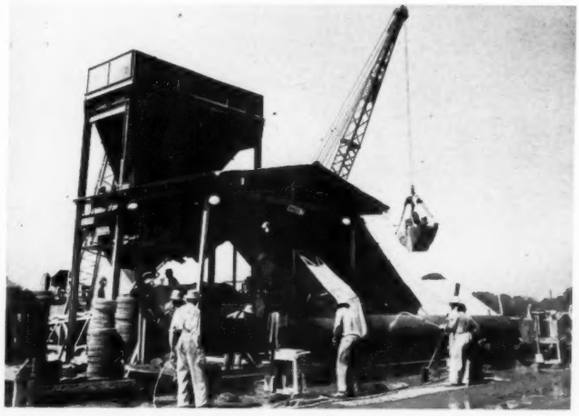
2. Sack cement, trucked in pallets from the rail siding by this Chevrolet 6400 truck, is picked up by a Hyster fork truck at the Morgan City yard and taken to the Wate-Kote machine, background. Sand is delivered by barge, and Illmenite, a heavy metallic ore, by rail. Both materials are hauled to the site and stockpiled near the coating machine.



3. The three ingredients, plus water, go into the Wate-Kote mix. Workmen feed sack cement to the conveyor leading into the plant. Illmenite is handled by the Insley crane, center, which has a special bucket calibrated to hold 900 pounds of ore. The crane buckets the material to a hopper that feeds the mixer. The Bucyrus-Erie 22-B, left, uses a clamshell to charge the sand hopper.

A total of 285 miles of 40-foot joints of steel pipe—coated with 2½ inches of concrete—were required for the underwater section of the "Muskrat Line". This is the 355-mile facility recently completed in the marshy coastal region of southeast Louisiana for the Tennessee Gas Transmission Co. Coating and wrapping, increasing the weight of the pipe by 242 pounds per linear foot, will protect the line against physical damage and the deteriorating effects of salt water and marine growth.

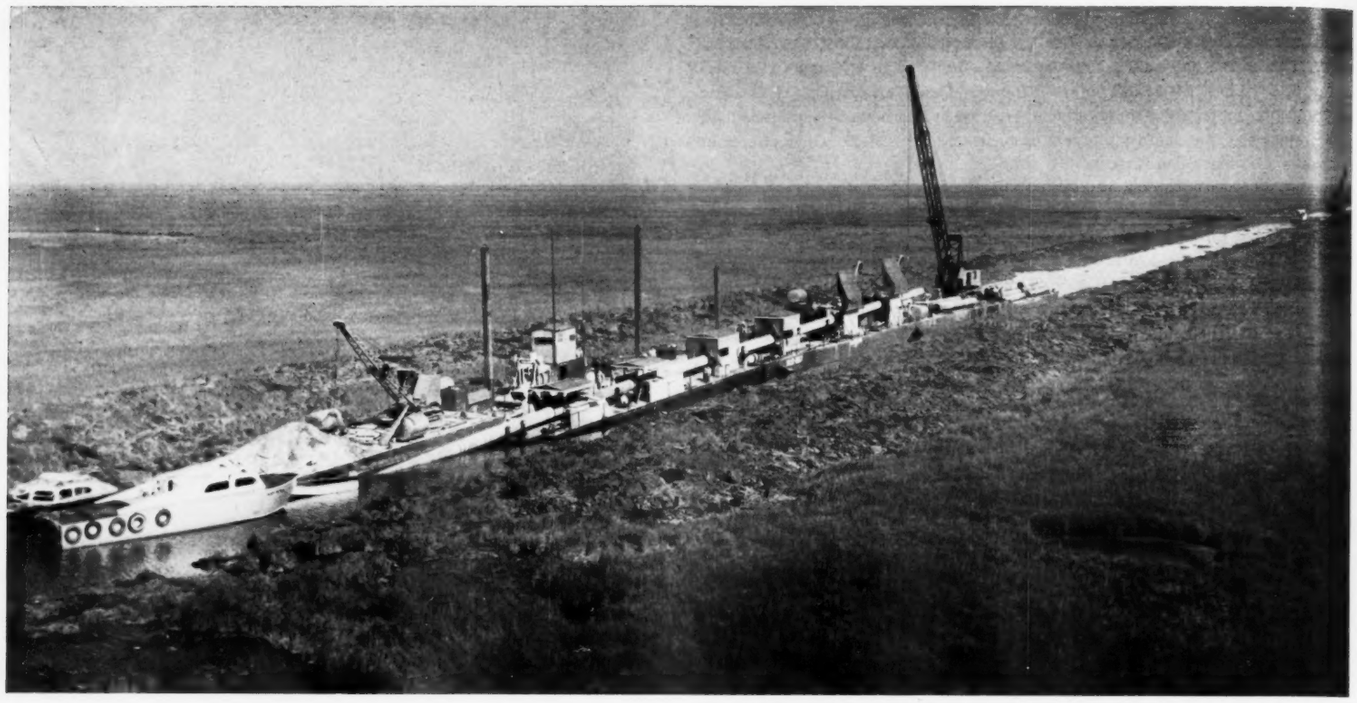
The four contractors turning out pipe for this job had yards near intracoastal waterway canals so that joints could be shipped out by barge. About 80 per cent of the pipe was encased by Rosson-Richards Processing Co., Houston, Texas, which operated plants at Larose, New Orleans, and Morgan City, La. Pipe arriving by rail at Morgan City was transferred by crane to truck-trailers and hauled to storage in the coasting yard. Coating operations began as they were swung to the cleaning and priming rack, then rolled by gravity to the coating and wrapping machine. . . .



4. At the Wate-Kote plant, the pipe joint is supported on a traveling carriage that continuously rotates the section. Wire mesh, from the stacks at left, is wrapped around the joint. As the pipe moves slowly past the mixer, a 2½-inch coating of concrete is applied under pressure in a single pass. Hunt Process Clear curing compound is applied with a hand spray.

5. About six minutes after being set on the carriage, the pipe is completely coated and is lifted off by a Lorain Moto Crane with special pick-up. The coating has increased the weight of the pipe to 13,800 pounds. The crane will stockpile the section in one of the pipe beds after all excess concrete has been cleaned off.

6. A Manitowoc 2000 crane loads the pipe to trailers that haul to the barge slip. Pipe is barged through the canals and bayous to the lay barges far out in the coastal marshes, where Houston Contracting Co., Houston, Texas, is joining and laying the line (See "Dry-Land and Marine Methods Combined for Muskrat Line" on the next page. *C&E Staff Photos*

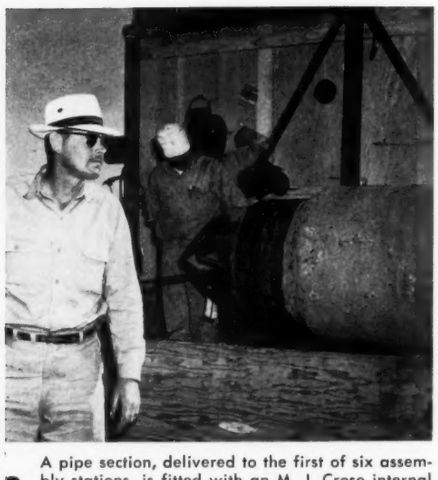


1 All assembly and laying operations are handled on a 330×30-foot float, formed by three 110×30-foot barges. The crane swings pipe sections to the assembly line; the completed line is slid off the rear of the barge into the trench. *C&E Staff Photos*

Dry-land and marine methods combined to lay "Muskrat Line"

by RALPH MONSON, field editor

Pipe-laying equipment and techniques adapted to underwater line; concrete-encased pipe is assembled on barge and laid by tractors



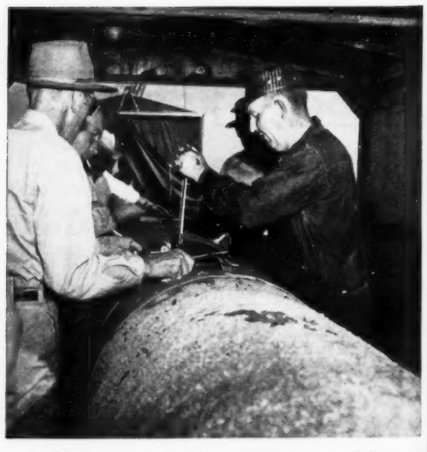
2 A pipe section, delivered to the first of six assembly stations, is fitted with an M. J. Crose internal pipe clamp that will receive the next length of pipe.

A group of contractors last summer completed what is probably the longest submarine gas pipeline in existence, the 355-mile "Muskrat Line" between the gas-producing area of the southeast Louisiana coastal region and the pumping and pipeline facilities of the Tennessee Gas Transmission Co. near Kinder, La. Tapping a number of offshore and onshore areas formerly without enough outlet, the line leads gas to the company's main transmission lines, which extend from south Texas into New England.

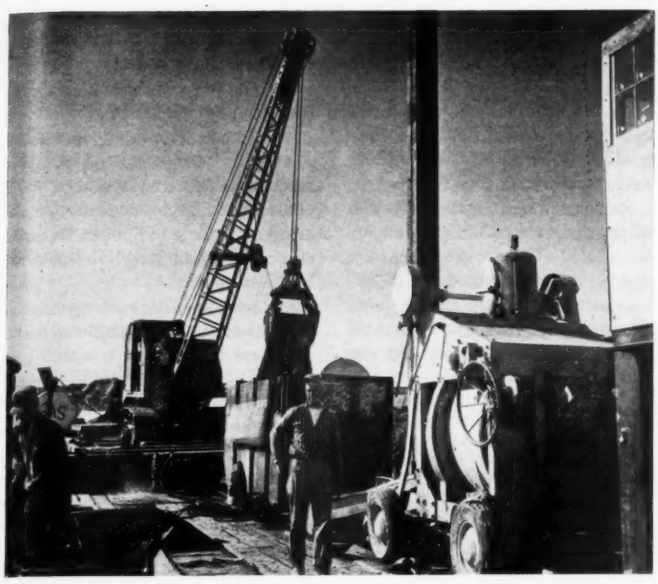
Beginning with a series of laterals in the delta area at the mouth of the Mississippi River, the "Muskrat Line" runs westerly through the flat, wet marshlands of the region for about four-fifths of its distance. Only on the westernmost 70 miles of the 24-inch main line, built by Grayco Con-

3 Joined pipe sections are welded at one of the six stations. The stations, 40 feet apart so that work can be done simultaneously on the 40-foot lengths of pipe, are on one side of the barge.

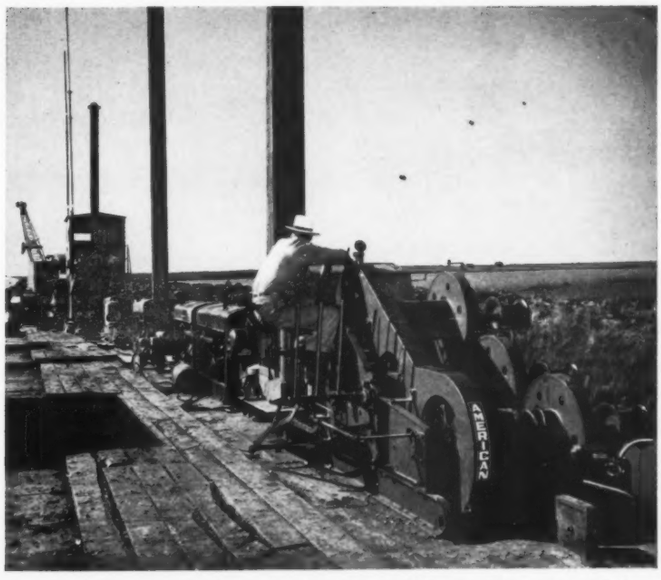
4 At the wrapping station, the welded joint is covered with Plioflex plastic tape instead of the usual hot dope and "granny" wrapping.



5 After concrete has been placed around the reinforcing that covers the joint, the fiberboard form is secured by Acme steel clamps.



6 On the opposite side of the barge, an Insley crane buckets aggregate from a supply barge to the bin supplying the Jaeger 11-S mixer at right. Concrete is wheeled across the barge to the pipe-coating station.



7 Auxiliary equipment lines the other side of the barge. The American 3-drum hoist, powered by a GM diesel, handles the spuds anchoring the barge. Lined up behind the hoist are Lincoln arc-welding generators.

structors, Inc., and Houston Contracting Co., both of Houston, was it possible for ordinary techniques and equipment to be used. The remainder of the line goes through areas too soft and wet to support conventional equipment and too marshy to float marine equipment.

The prime contractors placing the underwater section of the line—Houston Contracting Co. and Associated Pipeline Contractors, Inc., both of Houston, Texas, and Williams Bros. Co., Tulsa, Okla.—adapted their conventional pipe-laying equipment to the job and developed some new techniques to fit job conditions.

Dig flotation canal

These three contractors sublet the job of digging a 40-foot-wide and 8-foot-deep flotation trench through the swamp to J. Ray McDermott & Co., Inc., and Monroe-Wolfe, both of New Orleans, La. This made it possible for floating construction machinery to get to the site, excavate the pipe trench in the bottom of the canal, assemble the pipe sections on a lay barge, and set the pipe in the trench at an elevation of minus 10 mean low Gulf.

Basically, the work of all the contractors was similar; typical of the jobs was that done by Houston Contracting Co., which worked on an underwater section to the south of Houma.

In this area, the flotation canal had been dredged by Monroe-Wolfe with a fleet of eight floating machines ranging from a Bucyrus-Erie 54-B crane to a Lima 6-yard machine. Most of the trench was clammed out by cranes, which cast the material to spoil banks on both sides of the canal.

Monroe-Wolfe used a Bucyrus-Erie 88-B dragline with a Hendrix bucket to excavate the pipe trench, which extended about 4 or 5 feet below the bottom of the canal to an elevation of approximately 13 feet below mean low Gulf. Wherever the pipe intersects navigable waterways, however, the line was sunk much deeper.

Altogether, the 355-mile line makes 135 crossings of navigable waterways ranging from a few feet to as much as 7½ miles in width and up to 100 feet in depth. At the Mississippi River crossing, the pipe was laid 100 feet below water level; at Pass A'Loutre it was laid 80 feet deep, at the Atchafalaya River, 80 feet deep, and at the Wax Lake outlet channel, 52 feet deep.

Pipe assembled on barge

Pipe for the underwater section ranged from 4 to 24 inches in size and was pre-coated with a covering of heavy concrete—1 to 4 inches thick—to overcome buoyancy and provide resistance against the damaging effects of salt water and marine growth. (See "Pipe Encased in Concrete for Underwater Gas Line", pg. 96.)

Barge loads of this pre-coated pipe were brought from the coating yards via the Intracoastal Waterway and other waterway systems, to a junction with the flotation canal. Illmenite ore and cement for the pipe-joint coatings, as well as supplies of fuel and materials, were brought to the lay barge by similar routes. Crew boats also traveled the canal to bring workmen to and from the floating equipment. Only occasionally was a helicopter or marsh buggy used to get men or materials to the site.

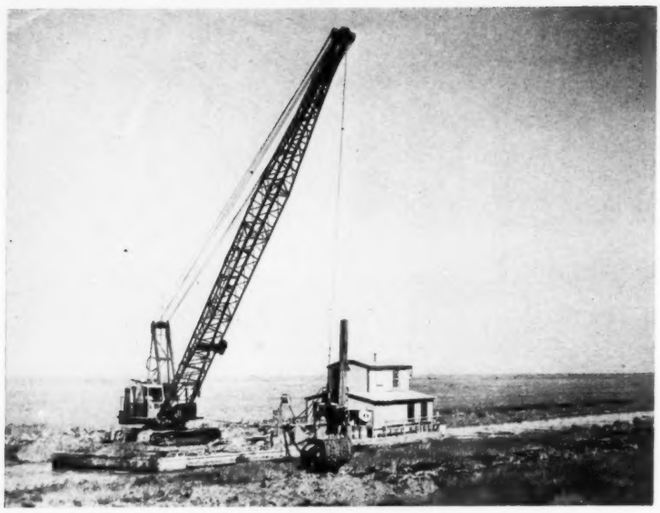
The 40-foot lengths of 24-inch pipe, which with their 2½-inch coating of heavy concrete weighed 13,800 pounds each, were assembled in the Houston Contracting Co. section on a lay barge. This consisted of three 110 × 30-foot barges lashed together to form a unit 330 feet long and 30 feet wide.

A crane at the forward end of the barge picked up the joints of coated pipe from the pipe barge—or, if the pipe had been strung out ahead, from the spoil banks—and swung them to one side of the lay barge. Here, two Cat D8 tractors used Trackson side booms to bring each new length of pipe onto a traveling cradle and into

(Continued on next page)

8 Assembly completed, two Cat D8's with Trackson side booms pick up the pipe at the forward end of the barge. The roofs of the first two stations are tipped back as the pipe is lifted off the traveling cradle.

9 The assembly stations on one side, and the line of equipment on the other, leave the center of the barge clear for the Cat tractors walking the pipe off the rear of the float.



A barge-mounted Bucyrus-Erie 54-B uses a Hendrix dragline bucket to excavate the pipe trench to an average depth of 13 feet below mean low Gulf.
O&E Staff Photo

(Continued from preceding page)

contact with the length previously placed.

The cradle, running the entire length of one side of the barge, consisted of a series of Athey track wagon rubber-tread tracks, turned upside down. Along the length of this cradle were six working stations, spaced 40 feet apart to match the length of the joints. This made it possible for men to work on six joints simultaneously. Pipe was assembled and tacked together at the first two stations, welded at the third and fourth, and the joints wrapped and coated at the last two stations. These coordinated operations went on continuously; as crews at the six stations finished their jobs, the joints were slid off the barge. Each of the six stations was covered with a plywood and canvas housing to protect workmen and welding equipment from the elements and to shield the flash of the welding arcs.

All the stations were arranged along one side of the barge; on the opposite side were ranged such equipment as the welding generators; concrete mixer; and the American 3-drum hoist powered by a General Motors diesel engine, which handled four steel spuds used to anchor the barge while the assembling, welding, wrapping and coating operations were in progress. This setup left the center of the barge clear for the tractors laying the pipe.

All the operations on the barge moved ahead smoothly once a pipe section was set on the cradle and held tightly by the Cat D8's with their Trackson side booms against the length previously placed. An M. J. Crose internal pipe clamp held the ends of the sections in perfect alignment as the pipe crew at the first station made the initial weld. Other lengths of pipe were added to the line as soon as newly joined sections were moved to the next station.

While sections were being assembled at the first two stations, welding crews at the third and fourth stations completed the welding of the joints with nine Lincoln 300-amp welding generators. These were powered by GM diesel engines.

At the fifth and sixth stations, the exposed portion of steel pipe at each joint was carefully wrapped and coated with concrete. Instead of using the usual hot dope and "granny" wrapping, the crew at the fifth station wrapped wide rolls of Plioflex plastic tape tightly around the exposed portion. Finally, reinforcing was set over the taped portion and a fiberboard form pulled up around the pipe and clamped with Acme steel straps and clamps. This held the ends of the form tightly around the encased portion of the pipe while the joint was sealed with a thin grout made of Illmenite ore, cement, and water.

This mix, prepared in a Jaeger 11-S mixer and poured into the top of the form, was worked around the joint by hand manipulation until the form was completely filled. Then additional Acme steel straps were banded and tightened over a cap around the top of the form and locked with an Acme strapping tool. The joint complete, a section of the pipe was ready to be lowered into the water.

Tractors walk pipe into place

When operations had been completed at all stations, the hinged roofs of stations one and two were tipped back so that the two Cat D8's could pick up the forward end of the assembled pipe. As the hoist operator raised the spuds and the tractors began walking toward the rear of the barge with the pipe, the barge moved

forward and the pipe slid off the stern into the trench.

As the completed joints were brought into proper position at the respective stations, the tractors stopped, the spuds were dropped, and all assembly operations were resumed.

On one 6-mile section that ran through the holdings of a land company, it was impossible to obtain easements for the flotation canal. In this area, a small backhoe was brought in to dig the trench while transportation was provided by marsh buggies. After the pipe had been assembled on the laying barge, it was sometimes floated and sometimes shoved into place on pontoons.

Survey by helicopter

Surveying the line through the marshland threatened to be a difficult and time-consuming job until company engineers used a helicopter to assist this operation. The line was started by transit from a survey tower. Then the helicopter flew ahead of the tower dragging a 1,000-foot measuring cable.

While a rodman held one end of the cable, the helicopter got on line by back sighting on the stakes already in place. Then the cable was pulled tight, an 18-foot lath planted in the mud to mark the point, and a second rodman left at the new station. The helicopter next flew back to pick up the first rodman and repeat the operation. With this method, the crew was able to stake out an average of 6 miles of line per day and to make up to 54,000 feet on a good day.

The Bell helicopter, one of the latest models equipped with a 425-hp engine, was supplied by Petroleum Helicopter, Inc., Lafayette and New Orleans, La., and was flown by veteran pilot Phil Fillingham.

Personnel

The project manager for Tennessee Gas Transmission Co. on the "Muskrat Line" was R. J. Baldwin. The construction superintendent was Leonard Robinson, and the project engineer was H. L. Ohlinger.

H. J. Muckley was project manager for Houston Contracting Co., and H. E. "Pat" Murphy was superintendent of this Houston spread, which worked south of Houma. R. R. Rice was welding foreman and J. H. Davis was pipe foreman on the laying barge.

THE END

Portable tandem roller

■ Littleford's Model 160 3 to 5-ton portable tandem roller is described in a bulletin. Details are given on the roller's complete power steering, and on the hydraulic-powered trailing conversion. A list of outstanding features of the unit is included in the bulletin. According to the specification table, the unit has a main roll compaction of 177 pounds per linear inch and is 48 inches in diameter and 38 inches wide.

To obtain Bulletin GG-32 write to Littleford Bros., Inc., Box 97, 485 E. Pearl St., Cincinnati 2, Ohio, or use the Request Card at page 18. Circle No. 50.

Portable pipe cutter weighs only 7½ pounds

■ A portable pipe cutting and beveling machine that weighs 7½ pounds and can handle pipe with diameters of from 1½ to 4 inches is available from the H & M Pipe Beveling Machine Co.

The Model O flame cutter uses the same split-gear principle as found in the manufacturer's large cutters for pipe up to 36 inches in diameter. A special boomer strap speeds up the process of changing the machine from one length of pipe to another, the company reports.

To change the unit from one size pipe to another requires only the replacement of adapters. The company advises that the change from the smallest to the largest pipe size can be made in a few seconds. Any plain-barrel machine cutting torch may be used with the unit.

The Model O flame cutter.

For further information write to the H & M Pipe Beveling Machine Co., 311 E. Third St., Tulsa, Okla., or use the Request Card at page 18. Circle No. 6.

Davey Compressor appoints

G. B. Edgell has been appointed manager of the engineering department for Davey Compressor, Inc., Kent, Ohio. Edgell has been affiliated with Davey Compressor since 1940, except for three years during World War I when he was in charge of the heavy mobile machine shop training division in the U. S. Army Corps of Engineers.

Interior of a Spartan trailer outfitted with showers, wash basins, and lockers. The trailers are of all-aluminum, all-riveted construction.

Line of mobile trailers for on-the-job living

■ A line of mobile aluminum living units, recommended for use by contractors where on-the-job living facilities are required, is available from the Spartan Aircraft Co. Spartan trailers range in size from 35-foot, 6,520-pound Royal Manor to the 50-foot, 9,000-pound Executive Mansion.

The trailers are available with layouts for use as employee living quarters, mess halls, kitchens, washrooms, showers, and lockers, recreational rooms, offices, and tool supply rooms. An example of the use contractors have made of the trailers was the 400-unit trailer city set up by the Guy F. Atkinson Co. for its employees during the construction of the McNary Dam in Oregon.

The trailers feature all-aluminum, all-riveted construction. Ultralite blanket insulation with reflective foil is said to provide all-weather comfort. Each trailer has an all-steel perimeter frame consisting of a C-channel electrically welded around the outside of the cross-members. The trailers ride on heavy-duty tandem axles with brakes on all four wheels.

For further information write to the Spartan Aircraft Co., 1919 N. Sheridan Road, Tulsa, Okla., or use the Request Card at page 18. Circle No. 96.

Mobile radio system

■ A bulletin from the Allen B. Du Mont Laboratories, Inc., describes the firm's Model MCA-105-B mobile radio system. The folder states that the system includes transmitter, receiver, power supply assembly, control head and microphone, speaker, antenna, power fuse assembly, and all necessary cables. The unit operates on 25 to 54 megacycles. Information is given on connectors, accessories, and mechanical specifications. Data is also included on the operating specifications of the transmitter and receiver.

To obtain Bulletin No. MC-327 write to the Allen B. Du Mont Laboratories, Inc., 760 Bloomfield Ave., Clifton, N. J., or use the Request Card that is bound in at page 18. Circle No. 35.

Brush saw

■ The Wilton brush saw, recommended for highway and roadside maintenance, is described in a mailing piece from the Williams & Hussey Machine Corp. Job photos show the 8 or 10-inch blade fixed at a 10 degree angle for close-to-ground cutting. According to the specifications, the gas engine is a 1.3-hp, 2-cycle, 3,500 to 4,000-rpm unit. The forward guide handle can be adjusted to the height of the operator and the contour of the terrain.

To obtain the mailing piece write to the Williams & Hussey Machine Corp., 21 Clinton St., Milford, N. H., or use the Request Card at page 18 Circle No. 70.

Cement bonding agent

■ Clynch-T, a product of The Dasco Chemical Co., Inc., eliminates scarifying, chipping, and roughening up of old concrete and plaster before repair work is done, according to literature from the firm. The compound can be applied to damp or dry surfaces and, according to the literature, it makes floors, runways, pavements, and bridges resistant to the effects of acids, alkalies, the weather, and flame.

To obtain the literature write to The Dasco Chemical Co., Inc., 1602 Thames St., Baltimore 31, Md., or use the Request Card at page 18. Circle No. 33.

The Pow-r Mole replaces the bucket on any standard tractor-mounted hydraulic backhoe.

Tractor-mounted backhoe handles new pipe pusher

■ A pipe pusher that attaches to any standard hydraulic tractor-mounted backhoe and can be operated by one man is announced by Pow-r Devices, Inc. Using two bucket mounting pins, the Pow-r Mole replaces the backhoe bucket.

The pusher has a 4-inch stroke and operates at up to 30 tons pressure. It will push ¾ to 3-inch pipe or tubing underground and can pull at the same speed with a change in the position of two drag springs. There is no need to turn the tractor around to reverse the direction of the operation.

The Pow-r Mole requires a trench 4 feet longer than the pipe sections that will be used and approximately 3 feet wide. It can be transported from place to place on the tractor or in the rear of a station wagon or pickup truck.

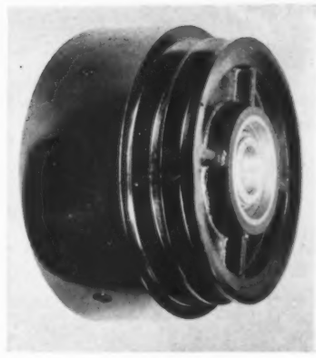
For further information write to Pow-r Devices, Inc., Clarence Center Road, Clarence Center, N. Y., or use the Request Card at page 18. Circle No. 131.

New clutch designed for low-rpm operation

■ A new clutch with a lock-in toggle action that causes disengagement at a speed of from 400 to 500 rpm lower than the engaging speed is announced by the Salisbury Corp. The Tog-O-Loc clutch, the manufacturer points out, allows the engine to idle at a stationary speed without slippage at relatively low operating speeds.

The lock-in toggle action also provides for a greater load capacity in proportion to clutch weight. The Tog-O-Loc clutch is recommended for use on most gasoline and diesel engines in the 10 to 50-hp range.

For further information about the clutch write to the Salisbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif., or use the Request Card at page 18. Circle No. 5.



The Tog-O-Loc clutch disengages at a speed of from 400 to 500 rpm lower than the engaging speed.

The Autocar DC102TL has a gross vehicle weight of only 33,000 pounds, made possible by the extensive use of aluminum in its construction.

Truck-tractors lighter through use of aluminum

■ A pair of lightweight truck tractors is announced by the Autocar Division of The White Motor Co. Each rig—the DC-102TL and the DC-10264L tandem axle—has an all-aluminum driver's cab which features a strong but lightweight aluminum skin over a girder-type frame of aluminum alloy, the manufacturer reports.

Formed channels are heli-arc welded. The aluminum skin is riveted to the frame by means of an aircraft production technique. This type of construction, according to the manufacturer, permits flexibility and stress absorption without danger of cracks and accomplishes a weight saving of 20 per cent in the cab structure.

Aluminum is also employed in various parts of the engine, the chassis cross members, the transmission case and cover, the fuel tank, the front and rear axle hubs, the hood, and the front bumper. Many of these parts are of all-aluminum castings or weldments; the wheels are of forged aluminum.

Standard engine for both models is a 165-hp Cummins diesel. Optionally, engines of 180, 200, or 250 horsepower may be obtained. The DC102TL has a gross vehicle weight of 33,000 pounds; the tandem axle rig has a 50,000-pound gvw.

For further information write to the Autocar Division, The White Motor Co., Exton, Pa., or use the Request Card at page 18. Circle No. 74.

Spirit levels

■ Four types of spirit levels are described in a bulletin from W. & L. E. Gurley. Information is given on the telescope and plate levels, and chambered and circular vials. The sensitivity and method of mounting the units is briefly noted. Data is included on mounted and unmounted levels.

To obtain Bulletin 7200 write to W. & L. E. Gurley, 518 Fulton St., Troy, N. Y., or use the Request Card at page 18. Circle No. 41.

Sling chains

■ Complete information on Campbell Chain Co.'s sling chains are contained in a catalog. Data is given on hooks, links, rings, and assemblies. Maintenance, and the uses of the items are detailed. Specifications on the various types of sling chains conclude the catalog.

To obtain the catalog write to the Campbell Chain Co., York, Pa., or use the Request Card at page 18. Circle No. 27.

Midget 4-blade trowel weighs only 75 pounds

■ A four-blade finishing machine that weighs 75 pounds and is said to operate effectively within one inch of walls and obstructions is announced by the Superior Cement Tool Corp. According to the manufacturer, the Superior Midget is small enough to pass through narrow doorways and light enough for one man to carry up and down stairs.

A crank adjustment permits the operator to switch blade pitch as much as 30 degrees while the machine is in motion. The power trowel's mechanical features include a sealed and lifetime-lubricated gear box, a stationary guard ring, cast steel tangential arm braces, and a mercury safety switch to prevent runaway.

The Superior Midget is powered by a 1.5-hp engine and has a blade sweep of 23 inches.

The trowel is powered by a 1.5-hp gasoline motor and has a blade sweep diameter of 23 inches. It is patterned after the Superior Senior, a 6.2-hp trowel with a 44-inch blade sweep.

For further information write to the Superior Cement Tool Corp., 11616 Wright Road, Lynwood, Calif., or use the Request Card at page 18. Circle No. 16.

Variety of input voltages operate two-way FM radio

■ A low-power, two-way FM radio communication system, for use in the 144 to 174-mc frequency range, and that operates on a variety of voltages selected by a switch, is announced by Bendix Radio Division. The Bendix Bantam will operate on 6, 12, 24, and 32 volts dc, or 117 volts ac without modification, adjustment, or external converters.

By means of a selector switch on the control panel the Bendix Bantam can be operated by any one of five mobile or stationary power sources.

Choice of input voltage is accomplished by turning a selector switch on the control panel, providing complete interchangeability between base and mobile applications, the manufacturer reports. It is impossible to damage the equipment by applying improper primary voltage because power is automatically turned off when the voltage selector is not positioned to match the incoming voltage.

Under normal operating conditions the Bantam will operate efficiently up to 3 miles and over greater areas in free-space antenna locations, the manufacturer states. The unit features dual-channel receiver and transmitter facilities, more than one watt of RF output power, and 1.25 watts of audio power to a built-in phenolic-cone loudspeaker.

The radio consumes about 2 amps at 6 volts dc and less at higher voltages. It weighs 24 pounds and measures $6\frac{1}{4} \times 10\frac{1}{8} \times 11\frac{3}{4}$ inches.

For further information write to Bendix Radio Division, Bendix Aviation Corp., 8633 Lock Raven Blvd., Baltimore 4, Md., or use the Request Card at page 18. Circle No. 85.

Tagline; tong puller

■ The TagMaster and TongMaster, products of the Morin Mfg. Co., are described in a mailing piece from the firm. The TagMaster drums are gear or chain-driven by the crane machinery, with the two tagline cables dead-ended on left and right corners of the log grapple. According to the literature, the TongMaster drum controls a ¼-inch line reeved over the heel boom and dead-ended on tongs. Both units are pictured, and according to the specifications, both provide up to 2,000 pounds line pull.

To obtain the mailing piece write to the Morin Mfg. Co., 946 Elm St., West Springfield, Mass., or use the Request Card at page 18. Circle No. 52.

Data on loaders

■ Specification sheets on the Trojan Loadster are available from Contractors Machinery Co., Inc. Model LHM-75, featuring 2-wheel drive with forward and reverse power shift, has a rated capacity of 1¼ cubic yards. According to the sheets, the Model LT-400 has a 4-wheel drive with torqmatic transmission and 1½ cubic yard capacity; Model LCM-100 has 2-wheel drive with torqmatic transmission, and boasts a 1½ cubic yard capacity. Complete specifications are included on each model.

To obtain the specification sheets write to Contractors Machinery Co., Inc., Clinton St., Batavia, N. Y., or use the Request Card at page 18. Circle No. 28.

Giant conveyors to carry gravel for Great Salt Lake crossing

Working near the dock area at Promontory Point, the 18-inch dredge, John C, cuts the lake bottom down to a 15 foot depth to accommodate the 2,000-cubic-yard bottom-dump barges that will haul rock and gravel to the fill site.

One of the biggest railroad fill jobs ever attempted—involving the placement of 35 million cubic yards of rock and gravel—has been started over a 12.3-mile stretch of Great Salt Lake, Utah, between Lakeside and Promontory Point.

This job, being done for the Southern Pacific Railroad by Morrison-Knudsen Co., Inc., Boise, Idaho, under a contract amounting to about $46 million, will take about four years to complete. Current preliminary work—sizable enough in itself—will require more than six months before earth-fill operations begin.

At present, the rail line runs on a wood-pile trestle from Promontory Point to Lakeside. This trestle, built in 1903 to save many miles in the old route around the northern arm of Great Salt Lake, is so advantageously situated that the new earth-fill crossing will be only 1,500 feet to the north.

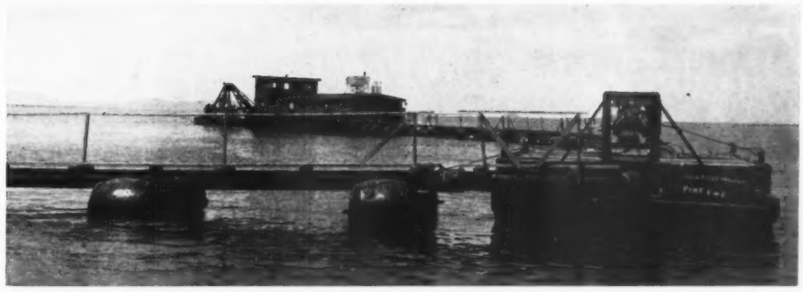
But this advantage is more than offset by the trestle's disadvantages. First of all, it is costly to maintain. Since its construction, virtually all the pile caps and decking have been replaced. The old wood piles are still in excellent shape after more than half a century of service largely because the lake has encrusted them with a layer of rock salt. The trestle can easily be damaged by fire, and only several months ago, a 600-foot section burned to the water line.

A study to determine the feasibility of an earth-fill crossing at this point was started in 1953, and under the direction of International Engineering Co., San Francisco, a considerable amount of sampling, probing, and seismic study was done. Sampling of the undisturbed lake-bottom material is still, in fact, continuing.

Bearing conditions in the lake bottom vary from good to poor. Oddly enough, one of the better bearing sections is in the middle of the lake, where a wedge-shaped section of solid rock salt will be able to carry the load of the earth-fill with very little difficulty. On both ends of the 12.3-mile fill, about 15 million cubic yards of dredging will be required to remove an average of 25 feet of mud from the lake bottom. A dredged cut 483 feet wide will be made through this mud to remove the poorest lake-bottom material.

Though the content of the several sections of the earth fill will depend on foundation characteristics, the fill itself will generally consist of a heavy 5-foot-thick cushion of sandy material in the bottom of the dredged cut.

Dock and barge construction, dredging, rock production mark start of 35-million-yard railroad fill project



Further offshore, the Skookum, a 13-inch hydraulic dredge, deepens the harbor approach. This rig will also be used on the 15-million-yard dredging job that is required to remove unsuitable material from the lake bottom at the fill area.

followed by a gravel cushion built to the level of the original lake bottom. A combination of gravel and rock fill will start at this point.

The under-water portion of the fill from the lake bottom to within 10 feet of the surface will consist of sloping, bermed sections of gravel bolstering a heavy core of rock. The heavy derrick stone in the core builds up on a 1½ to 1 slope from 10 feet below the surface to 18 feet above the water line. Ballast and tracks will be put down on this section of the fill.

Near the center of the lake, a 7,800-foot siding will be constructed so that trains will be able to pass each other on this line. Two reinforced-concrete culverts will be located in the fill so that there will be hydraulic equalization in the lake. These culverts will also provide passages for small boats.

Preliminary work

A vast amount of preliminary work, now underway, will make it possible for the job to meet the ambitious program schedule when earth-fill operations begin. At the peak of work, 30,000 cubic yards of gravel and between 14,000 and 18,000 cubic yards of rock will be placed daily.

Gravel, produced from a pit near Little Valley, northwest of Promontory Point and near the M-K headquarters and camp site, will be brought by conveyor system to a 60,000-cubic-yard surge pile and loaded by conventional tunnel-mounted gates and other conveyors to barges.

This method of operation means that almost two million cubic yards of material will have to be dredged at Promontory Point to make a first-class harbor and channel to deep water. Docking and repair facilities for water-borne and rolling equipment also have to be constructed.

Giant conveyor system

When all the preliminary work is finished, making it possible for the earth-fill work to go ahead, gravel that has been screened and crushed to minus 8 inches will be transported from the pit to the lake shore by a Hewitt-Robins 54-inch and 6,000-foot-long conveyor system that will generate its own power and work at record speed.

The belts in the system, moving at a speed of 800 feet a minute, will handle gravel at an average rate of 75,000 tons a day. When operating at full capacity, the conveyor system will be able to handle 90,000 tons in three

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shifts, or in 21½ hours.

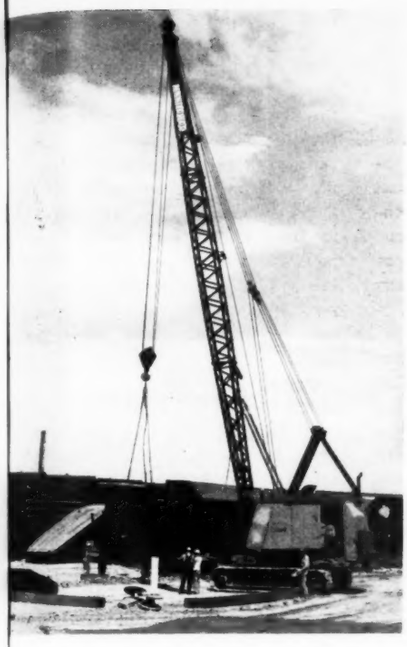
The main part of the conveyor system will require little or no power from outside sources once it gets rolling. The conveyors coast downgrade for a little less than two miles, dropping 400 feet in altitude, in the descent from the pit site to the lake, and three motors attached to the three main conveyor units will serve as a braking system for the belts. The conveyor system will be started and controlled by a patented drive mechanism, invented by Hewitt-Robins engineers, which uses special Won-Way clutches attached to a drive pulley and a holdback pulley. When power is required, the drive pulley will be automatically engaged while the holdback pulley remains freewheeling. Then, when the conveyor reaches full speed, the holdback pulley takes over and regulates the speed of the conveyor.

The energy created by the conveyor on the descent will be converted into electrical power by the motors, which will then become, in effect, electrical generators. This surplus power, amounting to about 618,000 watts an hour, will be fed to three electric shovels to supplement the power required to dig the gravel out of the pit.

The gravel delivered to the lake shore will be transferred to a stacking conveyor that will build a storage pile 70 feet high. Beneath this stockpile, recovery conveyors will operate in two tunnels. These conveyors, 72 inches wide, will run at 550 feet a minute and will have a combined capacity of 12,000 tons per hour. Overhead feeders will control the rate of flow to the conveyors, which will carry gravel about 250 feet to dump it into the barges plying between the shore and the fill area.

This huge conveyor system, built by Hewitt-Robins under a contract from Morrison-Knudsen, will use belting produced at the Hewitt Rubber Division in Buffalo. The machinery is being produced at the Robins Conveyor Division in Passaic, N. J., and

CMC and Marlow centrifugal pumps work round-the-clock to keep an area near the shoreline unwatered. In the background, the John C cuts the 15-foot-deep harbor required by the barges.



A Manitowoc 3000 crane positions a heavy steel section as barges are assembled. Seven 1,000-yard-capacity and six 2,000-yard capacity barges are being constructed by Chicago Bridge & Iron Co., Chicago, Ill.

the Jones Machinery Division, Chicago, Ill.

When the system goes into operation, six Bucyrus-Erie 150-B power shovels will be used to load the material. Hauling will be done by fifteen Euclid 25-ton bottom-dumps, and eleven Euclid 35-ton bottom dumps will do auxiliary gravel hauling. A large fleet of Cat tractors will be put to work cleaning the pit floors.

Some of this equipment is already working, although dock and barge construction is not yet finished and the conveyor system is not operative. In a typical day recently, drillers were using Gardner-Denver jackleg drilling machines to prepare 5 × 7-foot coyote-hole drifts, 1,500 feet apart, that extended 700 feet under the base of a mountain. Laterals, placed outward from these main drifts to crisscross the area, were being loaded with high explosives for a shot that would bring down a high percentage of rock. Broken rock was to be loaded into Euclids by Bucyrus-Erie 150-B shovels and transported to a 2,100-foot-long marine dock, now under construction, where barges will be loaded.

Dock and barge work

In addition to working on the main marine dock, pile drivers are busy constructing a tugboat way, a utility dock, and supplementary loading docks. Most of this work is being handled by one of M-K's cranes, with a set of swinging leads, a McKiernan-Terry 9-B-3 pile hammer, and an upright oil-fired boiler. Work on these waterfront facilities is well on the way to completion. Excluding about 1,000 feet of timber crib on the main dock, all the facilities are being built on

(Continued on next page)

In the rock pit near Promontory Point, a Gardner-Denver drill on an Air Trac carriage, working with a Gardner-Denver 600-cfm rotary compressor, drills powder holes for a blast. Rock will be loaded to barges by a conveyor system.

wood piles. Douglas-fir timber caps and standard joist and deck construction are being used.

At the same time, the flash of electric welding machines and the reverberation of rivet hammers draw attention to the fact that six huge steel bottom-dump barges are under construction. These are 250 feet long and have a capacity of 2,000 cubic yards. Seven smaller barges, with a capacity of 1,000 cubic yards each, will augment the larger barges.

Barge construction is being done by Chicago Bridge & Iron Co., Chicago, Ill., which is using a Manitowoc 3500 crane and a Lorain Moto-Crane for the work. These rigs are assembling the barges from steel supplied from the Napa, Calif., and Fontana, Calif., plants of Kaiser Steel Co.

Winds, which in fall and winter reach a velocity of 50 to 60 mph on the lake, are expected to create problems for the larger barges when the earth-fill work starts. The big barges float 9 feet off the surface of Great Salt Lake when they are empty and, in this state, they will be fully exposed to wind and waves. The water in the lake, which weighs 76 pounds per cubic foot, sometimes is whipped into waves which reach 7 feet in height.

Harbor dredging

Also at work near the waterfront area are two hydraulic suction dredges. One, working inshore near the dockline area, is the 18-inch dredge John C. This rig has an 18-inch centrifugal pump and is powered by General Motors Quad diesels.

Farther offshore, the 13-inch dredge Skookum, also powered by GM Quad diesels, is enlarging the harbor. The Skookum has her heavy digging ladder supported on pontoon floats independent of the front of the hull. This feature is expected to serve the rig well if heavy swells of water should break over her hull when she is dredging for the causeway foundation. The Skookum, which worked on the Alaska-Eklutna hydroelectric project, was only recently shipped back to the United States.

Both dredges were shipped dismounted to the Great Salt Lake site by rail, assembled at the job site, then launched in a drydock area that had been dug out by a dragline.

Personnel

The resident engineer on this project for the Southern Pacific Co. is H. J. Willard. Morrison-Knudsen's field operations are under the general supervision of O'Dean Anderson, project manager, who is assisted by Carl Larson, general superintendent; Denny Bagley, project engineer; William Anderson, land work superintendent; Frank Curry, water work superintendent; Richard Bingham, night superintendent; James Bonner, equipment superintendent; and Robert Woodhead, office manager. THE END

Atlas Powder offers new film on blasting

A 25-minute color motion picture "We're Blasting Near You" is available from the Atlas Powder Co., Wilmington, Del. The film, aimed for contractors faced with public relations problems in blasting operations in and near populated areas, describes the precautions that blasters take to prevent accidents and protect private property.

In addition to the film itself, the company will also provide a kit containing material and suggestions to assist in the planning, promotion, and execution of a program featuring the film.

To schedule a showing of the film write to the Explosive Development Section, Atlas Powder Co., Concord Pike and New Murphy Road, Wilmington 99, Del.

The Sasgen Derrick portable crane has a single-line load capacity of 3,000 pounds.

New portable crane has capacity of 3,000 pounds

■ A 350-pound portable crane, designed for general duty around maintenance areas, concrete-block plants, or wherever materials are handled, is announced by the Sasgen Derrick Co. The crane will carry a 3,000-pound load on a single line and has been tested to stand a 100 per cent overload, the manufacturer states.

One feature of the crane is a patented Safety Spur gear winch which operates with low friction and requires only seven turns of the crank to gain a complete drum revolution. According to the manufacturer, the 7:1 gear reduction provides easier and faster lifting with a minimum of wear on the working parts of the winch.

Seven turns of the crank raise the load one foot. Regardless of where the operator stops turning, the load is held securely in position. A 7½ and a 9-foot-high model, both with a 3,000-pound capacity, are available.

For further information write to the Sasgen Derrick Co., 3101 W. Grand Ave., Chicago 22, Ill., or use the Request Card at page 18. Circle No. 92.

Insulation for pipe

■ Gilsulate insulation for hot underground pipes is described in a bulletin from the American Gilsonite Co. After the mineral, Gilsulate, supplied in 2½-cubic-foot sacks, is poured on the pipe and tamped, the pipe is heated and backfilled. Underground pipe insulation is discussed, and the properties of Gilsulate are described.

To obtain the bulletin write to the American Gilsonite Co., 134 W. Broadway, Salt Lake City, Utah, or use the Request Card at page 18. Circle No. 25.

New Mahony-Troast office

The Mahony-Troast Construction Co., Clifton, N. J., has opened a new Delaware Valley Office in the Wilson Building, 130 N. Broadway, Camden, N. J., to take care of the firm's work in southern New Jersey, eastern Pennsylvania, and Delaware.

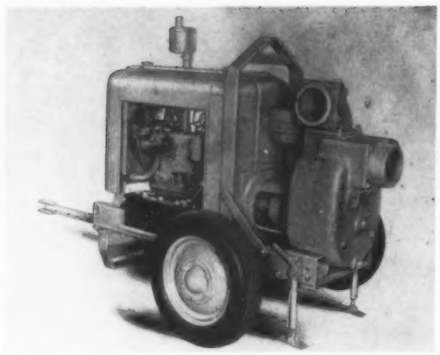
Personnel of the Philadelphia, Pa., office have been transferred to the new office.

New pump has more output, decreased size and weight

■ A 6-inch contractor's pump that is said to offer increased performance and decreased size and weight, as compared to other units, is announced by the Construction Machinery Co. The CMC Model 90-M utilizes lower engine speeds to do its job, thereby increasing pump life, the manufacturer reports.

The 90-M features dual volute priming action. The waterways of the pump will pass a 2-inch solid sphere. It has a top entrance suction connection. Safety controls automatically shut the unit off in case of high engine temperature or a dangerously low oil pressure.

The pump is powered by a 244-cubic-inch, radiator-cooled Continental engine that delivers 55 horsepower at 1,800 rpm. It is available with skids, steel wheels, or 550-16 tires.



The CMC Model 90-M contractor's pump features dual volute priming action.

For further information write to the Construction Machinery Co., 447 Vinton St., Waterloo, Iowa, or use the Request Card at page 18. Circle No. 100.

The new home of Knopke Bros. Contractors Supply, at 620 E. 18th St., Kansas City, Mo., has three elevators to serve the more than 40,000-square feet of area used as service, sales, office and storage facilities.

distributor doings

The Knopke brothers show what service really means

Moving from a headquarters with 11,000 square feet of space to a headquarters with 40,000 square feet is a big leap for any distributor. Knopke Bros. Contractors Supply, Kansas City, Mo., made it recently. It had to, according to the three Knopke brothers, who are partners in the business, if the firm was to live up to its motto: "Let us show you what service really means."

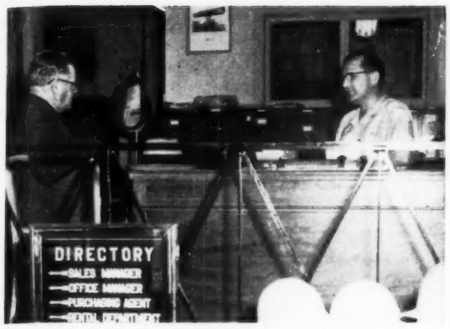
Customers are quick to sense that the owners know what service means and are anxious to provide it. Prospective buyers arriving at the new headquarters at 620 E. 18th St., have a 13,000-square-foot parking lot for their exclusive use; employees use a 30-car lot located across the street from the building.

Contractors or their representatives only have to go through the entrance to be greeted by any one—or all three—of the partners. Julian Knopke, general manager, has his desk near the front door. Not far away is the desk of Roman W. "Rum" Knopke, sales manager. The third brother and partner, Richard Knopke, is floor sales manager, and, if he isn't with a customer on the sales floor or tied up talking to a customer on the telephone, he's there to meet anyone coming through the door.

Julian and Rum have their desks near the door for a purpose. Customers never have to see secretaries or receptionists before getting to any one of the bosses. According to Julian, the three brothers learned long ago to "listen to our customers' ideas and suggestions that often crop out during the course of a conversation. We find many of these have helped improve our service."

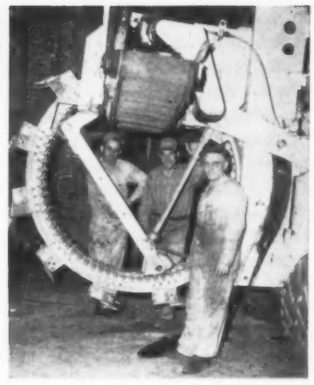
This drive to make service better and better permeates the entire organization—the new parts department just to the right of the entrance that takes up 20,000 square feet in the new headquarters as compared to the 8,000-foot area in the old location; the service department, which has a 4,000-foot area instead of the 500 feet it occupied in the old building; and the expanded rental and office departments.

In this big location, the firm operates as a virtual contractors' supermarket, supplying a customer with



Julian Knopke, general manager of the firm, discusses equipment problems with J. H. Oldham, operator of a rock quarry and concrete plant at Liberty, Mo. Julian's desk, at the main entrance, makes it easy for customers to stop and see him.

Thousands of parts storage bins, coded so that the location of any item and its price can be found in seconds by the Kardex system, are in the expanded headquarters at 620 E. 18th St., Kansas City, Mo.



Mechanics Garl Ray and Jack Blake of the service department take a breather in the job of overhauling a Bucyrus-Erie ditcher for Winn Rau, Kansas City, Mo. Mark Norbury, right, is manager of the department.

everything he needs—from a bolt to a big piece of equipment. The idea of operating the firm as a supermarket, where a contractor could make one stop to get all the equipment and supplies he requires, is the only thing that is not new with the firm. The brothers started the business along these lines ten years ago, but their "supermarket" then was a small operation called simply Contractors Supply, at 1712 Main in Kansas City.

Had little stock

The only one of the three who had had any experience with dealerships at that time was Julian. He had worked for two Caterpillar distributors from 1936 to 1946. Roman, who had just got out of the Army, and Richard, who had just got out of the Navy, joined Julian in painting and redecorating the home of their new business. The three opened their doors on February 2, 1946, with a stock consisting of a meager supply of wire rope and a small amount of hydraulic hose.

"We didn't have much of anything", Julian laughs, "but a lot of ambition and hopes, so we had plenty of time to look for scarce items for contractors. We almost acted as a brokerage firm, with virtually no stock of our own. But we found out what contractors wanted and kept building up a stock of these items."

This was the start of "supermarket" service—having contractors make one call to have all their needs filled. Equipment and supplies were in short supply just after the war, and contractors didn't have time to look around for all the equipment they required. Julian, Richard, and Roman did though, and they used to say to contractors, "Don't make a lot of calls to find an item, make one call—to us—and we'll find it."

The contractors who took them at their word gave the three some rough assignments, but they usually came up with the needed item. Roman remembers a call from a pipeliner, making a crossing of the Missouri River, who called and asked for a diver. Roman started work on filling this request by calling the sheriff, who referred him to the U. S. Army Corps of

(Continued on next page)

Engineers. The Corps got a diver to take on the work.

The going was rough at first—1946 was not the best year to start a dealer business. Shortages in materials and equipment just after World War II made it difficult for manufacturers to supply distributors already on their lists and few manufacturers wanted to add to the burden by appointing new dealers.

A big lift for the fledgling firm were the war surplus property certificates that Richard and Roman were able to get under the GI bill. With these, Contractors Supply was able to buy dirt-moving equipment, which in 1946 was hard to come by and easy to sell.

The first major account the firm received was for LaPlant-Choate dirt-moving machines. The first employee, hired four months after the firm started operating, was Tommy O'Connor, who is still working for the Knopke brothers as city salesman. The firm made its first big move when it was a year old, transferring its operations to 1728 Walnut and remaining there until the move to the bigger headquarters this year.

Three-time All-American basketball star, Doug Keaton, who was stricken with polio in 1946, has charge of the Kardex perpetual inventory system. This shows the exact number of a particular item in stock, its location, and its price.

During these years, the firm became exclusive distributor for Bucyrus-Erie, Case tractors, Gilson mixers, McCulloch chain saws, Wagner Scoopmobiles, Transport Trailer lowbed trailers, Thurman scales, Macwhyte rope and Pacal cutting edges.

Firm keeps growing

The Knopke brothers added more people, until its staff totaled 36—including seven salesmen. Phil Gregg and Bill Solverson work as city salesmen with O'Connor, John Mulvihill covers south-central Missouri, William Fritz works in north and central Kansas, Harold Herring has the northern Missouri territory, and R. R. Wilson handles southern Missouri and southeastern Kansas.

As the firm kept growing—in size and in reputation—it added more accounts, among them Hamilton conveyor belting, Paper-Calmeson cutting edges, Marsh Engineering conveyor systems, Continental Boiler equipment, Carver pumps, Prewitt and Ka-Mo augers, Ottawa Steel loaders, Miro-Flex signs and barricades, and Westrac tractor rollers and rippers. Hobart, Malsbary, Getman, Kohler Gar-Bro, Sam Mulkey, Aeroil, Templeton-Kenly, Coffing Hoist, Ridge Tool, and S. K. Wellman made the firm a distributor for their equipment. Items like Bica space heaters, Felker saws, Winslow equipment, Universal generating plants, American Steel Works asphalt kettles, Mid-Western backhoes, and Owatonna and J. H. Williams hand tools gradually found their way into the stock of Contractors' Supply.

Throughout its expansion, the Knopke firm held fast to an idea it had at the start—contractors only have to make one call to get what they want and, if the item isn't in stock, it will be found. The brothers didn't turn down any call for help—even if a contractor only needed a bolt. "Many firms look on this han-

Some of the pre-cut, prepackaged chain, ready for over-the-counter sales, is inspected by Willard Medley of the parts department.

dling of small items as a nuisance," Julian says, "but we don't look at it this way. To us, any order, no matter how small, is an opportunity to serve and know our customers better. If a contractor needs an odd-sized bolt, the need is often as great as though the item were a big machine."

Big parts department

Filling contractors' needs has become a streamlined operation in this new contractors' supermarket. The new parts department, located just to the right of the headquarters entrance, boasts of more than the 20,000 square feet of space it occupies. There's a new order form, which is only the old form revised to make service faster; additional personnel; revised packaging methods; more power equipment for handling orders; and an inter-communication system for controlling the processing of orders.

Just before Knopke Brothers Contractors Supply moved to its new location, two months were spent setting up bins in the department, repairing shelves, and getting 100 new bin sections for the sales floor so that the 19,500 items stocked could go into the correct bin and time and service would not be lost when the move was made. The new department has more display area, Richard explains, "because we couldn't ask our customers to guess what we have, we've got to show them."

Parts department manager Fred Harvey has a well organized staff to get orders moving out to customers fast. These men have a continuous training program, which includes schooling at factories making equipment handled by the dealer.

As an order is received, over the counter, by telegram, by phone or by letter, it is logged on the new order form, the correct parts number filled in, and sent to the Kardex department so that the items can be located and made ready for delivery.

The Kardex department is operated by Doug Keaton, who hasn't let polio keep him from a responsible job or being an All-American basketball player. Keaton was a varsity quarterback for Central College, Fayette, Mo., when he was stricken with the disease and paralyzed from the waist down in 1946. In 1947, Keaton started playing basketball with the Kansas City's Rolling Pioneers, and since then has won All-American status in 1949, 1951, and 1956. Right now he is national vice president of the National Wheelchair Basketball Association.

Doug can tell within seconds the location and price of any of the 19,500 items carried in stock and ready for shipment. Dovetailing with Keaton's work is that of purchasing agent Frank J. Tumberger, who makes certain that parts are in stock when they are needed. Each item has a separate inventory control card, and when the number of a particular item reaches a predetermined minimum, Keaton flags it with a red tag—the sign for Frank to re-order.

Whenever an order is ready to go out, there is no delay at the shipping dock. The firm has separate shipping and receiving docks so that both operations can be handled simultaneously and congestion avoided.

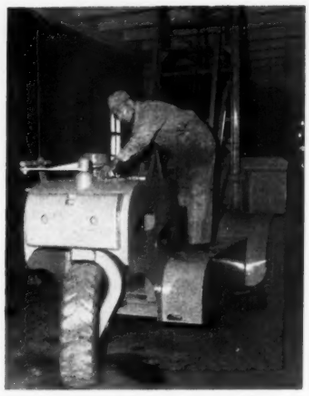
In their search for new techniques to expedite orders, the Knopke brothers have come up with what they like to call supermarket service on chain and wire rope. Lengths of chain and wire rope most often needed by contractors are now already cut and packaged so that a customer can have his order filled over a counter. This frees trucks and men that would otherwise be tied up while the order is waiting to be filled. Electric-powered coiling machines wind and cut the wire rope, an operation formerly done by hand.

The service department in the new headquarters is big enough to take care of the largest piece of equipment handled by the company. With 4,000 square feet instead of the 500 feet available in the old building, and with a door extending the entire length of the shop, Mark "Swede" Norbury and his five men can take care of servicing on any equipment a contractor brings in. This department is laid out in service areas, one being reserved for work on smaller equipment, including Davey compressors, the Thor line of air tools, Master and Dart vibrators, and the McCulloch chain saw line. Tests are always run after equipment has been serviced to make sure that the machines are ready to go to the next job. This department is on call 24 hours a day, and a crew is always available to fix

breakdowns at job locations. When work slows down in winter, the service department gives the firm's rental machines a complete overhaul.

Equipment rented

A sub division of the department regularly handles the servicing of rental equipment. The firm was originally Contractors Supply. During the Korean conflict, a second company known as Knopke Brothers was formed to handle rental and used equipment. This second firm has a fourth brother—William—as an inactive partner. The rental department is headed by assistant sales manager Ralph Eskelson, who usually asks the contractor how the rented machines performed on the job and who always checks a machine to make sure it is in top-notch condition for the next rental. Almost any kind of equipment a contractor needs—from a wrench to a scraper—can be supplied by Eskelson. Big rental equipment is kept in a 100×130-foot lot to the north of the building, while lighter equipment is stocked on the second floor. If a contractor wants to keep a piece of rented equipment, he can take advantage of the Knopke rental-purchase plan, which gives him credit for rentals already paid toward the purchase price. Sold items are replaced with new machines.



A Wagner Scoopmobile, acquired in trade, is being completely reconditioned at Knopke Bros. Contractors Supply. Mechanic Jack Blake is working to get the machine in top shape.

The office department is just plain work to Bob McGurn, office and credit manager, but to the rest of the staff it's a vital arm of the sales department, keeping confusion from overwhelming the entire dealer operation. Here, in a space four times the size it had in the old building, bookkeeper John Condon, stenographic clerk Oliver Gardner, and billing clerk Charles Lowe take care of the important routine of billing, bookkeeping, pricing, credits, and inventory control.

The brothers can be proud of their contractors' supermarket, which is due not only to their hard work but also as Julian says, "to our customers belief in our service and appreciation of our continued efforts to supply a one-stop store". Despite the new headquarters, this is one thing which hasn't changed. The Knopke brothers are just as eager today to have customers call for an odd-sized bolt as they were ten years ago. "In fact," Julian adds, "we might stock it now."

THE END

Dealer for Cleveland

Thirty northern Ohio counties are served by Marks Tractor & Equipment Co., distributors of trenchers and backfillers for the Cleveland Trencher Co., Cleveland, Ohio.

The dealer has headquarters at 4300 Brookpark Road, Cleveland. Branch offices are located at 1310 Connant St., Maumee; 4393 Lake Park Road, Youngstown; and 3603 Cleveland Ave. N. W., Canton.

Air Placement appoints

Air Placement Equipment Co., Kansas City, Mo., has appointed the Day & Maddock Co. of 8201 Almira Ave., Cleveland 2, Ohio, distributor for the Airplaco line of concrete gunning, mixing, and pumping equipment in northeastern Ohio.

Cleaver-Brooks dealers

The line of boilers and equipment made by Cleaver-Brooks Co., Milwaukee, Wis., is being handled in Union, N. J. by Miller & Chitty Co. The firm

distributor doings

is located at 1367 Stuyvesant Ave., and its territory includes counties in the northern part of the state, plus Staten Island, N. Y.

Counties in southern Texas make up the territory of another Cleaver-Brooks dealer, Jim Marshall Sales Engineering Service, 135 W. Hollywood, San Antonio.

Maquinarias Mendoza, CA has been appointed as the firm's representative for its line of boiler equipment in Venezuela. The main office of the new sales agent is at Avenida Sucre 363, Caracas, Venezuela; branch offices are located at Maracaibo, Maracay, and Baraquismeto.

Giles & Ransome handle Bucyrus-Erie equipment

The Philadelphia, Pa., firm of Giles & Ransome Inc., is offering sales and parts service on Bucyrus-Erie excavators and cranes in eastern Pennsylvania, southern New Jersey, and Delaware.

The firm, located at 2729 Hunting Park Ave., has a branch office on state route 40, Bear, Del.

Koehring appoints

The Koehring Co., Milwaukee, Wis., has appointed Construction Equipment Co., Ltd., Regina, Canada, distributor for the complete line of heavy-duty construction machinery manufactured by C. S. Johnson Co., the Kwik-Mix Co., and the Parsons Co., subsidiaries of Koehring. A branch of Construction Equipment Co., Montreal, the new distributor will cover the province of Saskatchewan. It has established sales, service, and repair parts facilities at 777 Broad St., Regina.

J. D. McPherson is sales manager.

Edmund W. Griffith dies

The manager of the Westbury, Conn., plant of H. O. Penn Machinery Co., Inc., Bronx, N. Y., Edmund W. Griffith, died Sept. 1. A member of the Penn Machinery company for four years, he organized the sales and management operations of the firm's Long Island, N. Y., plant, and supervised the building of the organization's Westbury, Conn., plant. Prior to joining Penn, Griffith was a sales representative for the Lone Star Cement Co.

To fill the vacancy left by Mr. Griffith's death, William J. Tuerk has been appointed manager of the Westbury, Long Island, N. Y., plant. Mr. Tuerk is a 16-year veteran with the Penn organization.

J. M. Holiman, vice president and general manager of Euclid-Mississippi, Inc.

Euclid opens branches

Euclid Division of General Motors Corp., Cleveland, Ohio, has opened a new distributor branch, Euclid-Mississippi, Inc., in Jackson, Miss., to cover the central and southern counties of the state. Temporary headquarters for the branch are located at 419 Dory St., Jackson. Vice president and general manager for the new company is J. M. Holiman. Other personnel include R. G. Hopkins, sales representative; Herman Harrison, service manager; Bill Hawkins, office manager; and Joel W. Gibbons, secretary-treasurer.

Shreveport Equipment Co., 3228 Barksdale Blvd., Shreveport, La., will serve the northern counties of that state. J. E. DeVore is the manager of the new company.

Dealership shifted

King-McIver, Inc., Greensboro, N. C., has acquired the diesel sales and service operation of the E. F. Craven Co., Greensboro. King-McIver, newly organized to handle the Detroit Diesel industrial line of engines, is headed by Jetton King. John J. McIver is secretary and treasurer.

Construction camera

The first step in street reconstruction in Chicago is done with two Michigan tractor-shovels. The buckets, equipped with scarifier teeth, start the job of stripping asphalt from a street scheduled for repairs. The machines strip 3,600 yards of asphalt in eight hours.

Fill work and channel deepening complement each other on a project near Hallandale, Fla. This Lorain dragline with 70-foot boom and 2½-yard bucket is deepening the Intracoastal waterway by 10 feet. Excavated rock will fill tidewater land for commercial and residential use.

Civil Service exams

The U. S. Civil Service Commission has announced examinations for highway and bridge engineer positions paying $5,335 to $8,990 annually, for duty principally with the Bureau of Public Roads of the Department of Commerce in Washington, D. C., and throughout the United States.

Applicants must have appropriate engineering education and experience, and for positions paying up to $6,115 a year, education alone may be qualifying. Full information regarding the requirements may be obtained at post offices or from the U. S. Civil Service Commission, Washington 25, D. C. Applications will be accepted by the Board of U. S. Civil Service Examiners, Bureau of Public Roads, Department of Commerce, Washington 25, D. C.

Civil Service examinations for engineering positions in the Bureau of Reclamation in the western states and Alaska are now open. Starting salaries range from $4,480 to $6,115 a year; and appropriate education and/or experience is required. Applications are being accepted by the Central Board of U. S. Civil Service Examiners, Bureau of Reclamation, Denver Federal Center, Denver, Colo.

Book on foundations treats of design, construction

"The Design and Construction of Engineering Foundations" by F. D. C. Henry presents the current practice and possible future trends in engineering foundations in the United States and Great Britain. Topics covered are geology; soil mechanics; individual, continuous, and raft footings; retaining walls and culverts; cofferdams and caissons; piling, bearing piles, bridge abutments, and piers.

The book can be used as a textbook for courses where soil mechanics and foundations are treated together, or for practicing engineers. Footnotes, diagrams, charts, and formulas supplement the material. Appendices and an index are included.

Priced at $9.00, the book is available from the publisher, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

Concrete for the second floor of the Bethesda Hospital Nurses' Home in St. Paul, Minn., is delivered to forms by Prime Movers, each handling about 15 yards of material per hour. Two of the buggies can load simultaneously at the 2-yard hopper, which is equipped with double gates.

Unusual among dams is the one being built for the Lone Star Steel Co. near its home plant in Dangerfield, Texas. An International 75 Payscraper, push-loaded by an International TD-24, works on the 2,200-foot-long earthfill dam, which will form a lake to be used as a settling basin for plant wastes.

Standard engineering text published in new edition

The third edition, of "Contracts, Specifications and Engineering Relations", by Daniel W. Mead, is a standard text that covers law, contracts, specifications, and the writing of technical reports.

In this edition, more emphasis has been placed on methods to be followed in preparing specifications than on the detailed description of methods and processes. The specifications section is based on actual specifications currently in use, and a complete set of specifications is included as an appendix. Another lists organizations that publish standard specifications.

The book also has chapters devoted to personal and ethical relations, competitive bidding and contracting procedures, advertising and letting contracts, contract papers, and designs and specifications for engineering and architectural work.

The 427-page volume is priced at $7 and may be ordered from the publisher, McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36, N. Y.

HRB bulletin covers flexible culverts

"Flexible Culverts under High Fills" is the topic of a new bulletin from the Highway Research Board. The bulletin contains four papers presented at the organization's 34th annual meeting held last year.

The first paper covers tests on three corrugated metal culvert pipes, each 7 feet in diameter and 512 feet long, under 137 feet of fill. Existing earth pressure theories on low or medium height embankments to unusually high embankments over flexible-type culverts form the essence of the second paper. The installation and performance of a 66-inch diameter culvert under approximately 170 feet of earth fill comprises the third paper. The fourth and last paper discusses the design of embankments and culverts, and includes the amount of settlement and lengthening of 46 culverts and sluiceways.

Priced at $3.30, Bulletin 125 may be purchased from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Construction camera

In the almost inaccessible Feather River Canyon in California, workmen assemble an Armco metal bin wall that serves as a foundation for an access road to the Pacific Gas & Electric Co.'s Poe power project on the river. Costly side-hill cuts were not justified for the roadway. The metal bin wall, backfilled with native granular material that was tamped both inside and behind the metal bins, runs 1,000 feet along the curving canyon walls. Corrugated metal pipe, installed through the wall, supplies drainage outlets for the steep slopes above the roadway.

Issue revised edition of architectural standards

The fifth edition of "Architectural Graphic Standards", by Charles G. Ramsey and Harold R. Sleeper, is now available from the publisher, John Wiley & Sons, Inc. Topics covered in the 758-page book include footings, foundations, and retaining walls; steel and concrete construction; waterproofing and expansion joints; and exterior wall facings and veneers.

The book, designed for architects, engineers, builders, draftsmen, and students, contains data on curtain walls; roofing and sheet metal; furring, lathing, and plastering; and landscaping and site work. A 29-page index completes the book.

Abounding in charts and diagrams, the $18.50 book may be obtained from the publisher, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Booklet on supervision of engineering personnel

"Supervision of Scientific and Engineering Personnel", published by the Industrial Relations Section of the California Institute of Technology, Pasadena, Calif., is an outline of conferences held on that subject by the institute.

The booklet is divided into sections which deal with such things as the development of the professional employee, building a technical team, appraisal of performance, the supervisor's role in development, etc.

The booklet and a supplementary volume, "Conference Leader's Guide for Supervision of Scientific and Engineering Personnel" is priced at $8.75 per copy. Copies can also be ordered in quantity. Orders for single copies should be sent to the Bookstore, California Institute of Technology, Pasadena, Calif. Information on quantity orders may be had from the institute's Industrial Relations Section.

In laying blacktop on the Massachusetts Turnpike, the contractor had his lead Blaw-Knox PF-90 paver put down a 16-foot strip. The second B-K paver is working a 12-foot width. A third 10-foot lane will complete the 38-foot roadway. Each half of the divided highway has two 12-foot lanes with 4 and 10-foot shoulders.

In the wilderness of Olympic National Park in Washington, a Bucyrus-Erie 38-B shovel with a 1½-yard dipper clears the way for a 7-mile access road being built for the U. S. Bureau of Public Roads. Most of the excavation consists of weathered granite and a loamy soil overburden.

Reflective glass beads used on warning signs

■ Warning signs for highway traffic control, featuring a coating of reflective glass beads, are announced by the Cataphote Corp. According to the manufacturer, signs reflectorized with the new coating process permit a saving of 25 per cent in cost over other methods using reflective sheeting.

The manufacturer reports that the smooth surface resulting from the use of the glass bead coating aids in making the signs resistant to dirt and weather. The beads have an ultra-high reflective index and wide angularity, providing more effective reflectorization under adverse conditions, the manufacturer points out.

White on red "stop" signs, reflectorized by the new process are available in the standard 24 × 24-inch size or the 30 × 30-inch size. Also available are green and white information signs such as those used on turnpikes and freeways.

For further information write to the Cataphote Corp., 958 Wall St., Toledo, Ohio, or use the Request Card at page 18. Circle No. 145.

N. J. Parkway issues new road map

The New Jersey Garden State Parkway has issued the sixth edition of its road map. The new map incorporates the latest information and details about the 164-mile route. The official names of the Parkway's 10 across-the-road toll plazas are also included in the map.

At present, the new official trail-blazer, the symbol sign leading to the Parkway, is being posted along main highways as a clearer guide for motorists seeking the road. While retaining the disk shape and yellow-green coloring, the sign has been increased in over-all size and features the word Parkway prominently across the middle.

Construction camera

The mountainous terrain south of Monticello, Ky., makes earth work difficult on the new state road being built through this area. The blasted rock and earth at this site is being loaded out to a Euclid 15-ton rear-dump by a Bucyrus-Erie 38-B shovel.

Some of the world's largest refining units—many of them as high as a 20-story building—dwarf a Manitowoc crane working in the main processing area of the Tidewater Oil Co.'s Delaware Flying A Refinery near Delaware City, Del.

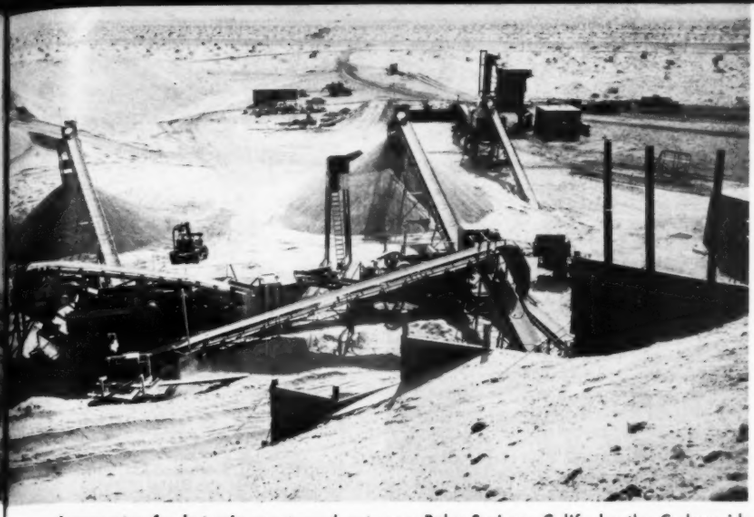
Banner-Type Road Show folder is available upon request

The Road Show Publicity Committee has a new banner-type folder prepared as a promotion piece for the coming Road Show. The folder, when opened to its full width, provides a banner suitable for hanging in offices and shops.

Copies of the folder may be had by writing to Harvey A. Scribner, Chairman of the Road Show Publicity Committee, 155 N. Wacker Drive, Chicago 6, Ill. Copies are limited.

The Road Show will be held at the International Amphitheatre, Chicago, Ill., from January 28 to February 2, 1957.

It is estimated that about 25,000 people will visit the Road Show, the first to be held in six years. The American Road Builders' Association will hold its convention at the same time.



Aggregates for hot mix are turned out near Palm Springs, Calif., by the Cedarapids plant and conveyed to stockpiles until they are needed by the Standard Steel 6,000-pound batch plant, right. McCammon-Wunderlich Co., East Palo Alto, Calif., is using the material to pave 14 miles of the road in the background.

Uphill loading is done by a Cat 470 scraper—with an assist from a Cat DW21 tractor and a Cat D9—at the site of the $95 million Olin Mathieson Chemical plant near Hannibal, Mo. Uphill loading on the earthmoving job is carried out because of the "dead" loading characteristics of sand and gravel in the area.

HRB bulletin treats spacing in concrete

"Joint Spacing in Concrete Pavements", a new Highway Research Board bulletin, reports on experimental concrete pavement projects in the states of California, Kentucky, Michigan, Missouri, and Oregon. It describes the condition of the pavements in the states, and presents data collected up to the present time. The projects were constructed in cooperation with the Bureau of Public Roads for the purpose of studying joint spacing in plain and reinforced-concrete pavements.

It was shown that the plain concrete sections have transverse contraction joints in relatively close spacing, 15 to 25 feet; and expansion joints at 120, 400, 800, and 5,280 feet. The reinforced sections have expansion joints at 120-foot spacings with one intermediate contraction joint. In general, load transfer devices were used in all expansion joints, but in only some of the contraction joints.

Priced at $2.70, the bulletin may be ordered from the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Steel-frame buildings

■ Job photos of rigid frame-type steel buildings are contained in a folder from Armco Drainage & Metal Products, Inc. According to the specification table, frames are available in various lengths, in increments of 20 feet. Frames are available in clear span widths of 40, 50, and 60 feet.

To obtain Folder SX-7756 write to Armco Drainage & Metal Products, Inc., 1939 Armco Ave., Middletown, Ohio, or use the Request Card at page 18. Circle No. 22.

Bendix appoints two radio sales engineers

The Bendix Radio Division of Bendix Aviation Corp., Baltimore, Md., has appointed two mobile-radio sales engineers. Tanney E. Oberg will be responsible for sales throughout the state of New York.

Jack E. Peters will handle sales in the Ohio and western Pennsylvania territories.

Aluminum cuts one ton off dump body's weight

■ An aluminum dump body manufactured by the Perfection Steel Body Co. is reported to weigh 2,000 pounds less than the usual all-steel dump body with a comparable 20-cubic-yard capacity. The use of a new Perfection front-mounted telescopic hoist is said to reduce the rig's over-all weight by another 1,000 pounds, resulting in a total payload gain of 3,000 pounds.

The 20-foot-long body is constructed of 3/16-inch aluminum sheet metal throughout. The rig is of all-welded construction.

For further information write to the Perfection Steel Body Co., Galion, Ohio, or use the Request Card at page 18. Circle No. 122.

A front-mounted telescopic hoist and the use of aluminum sheet metal reduced the weight of this new Perfection dump body by a total of 3,000 pounds.

Replaceable digger teeth fit into weld-on adapter

■ Replaceable digger teeth that are secured to adapters welded onto the old teeth are available from Allied Steel & Tractor Products, Inc. Bulldog digger teeth fit most popular makes of shovel dippers and backhoe, dragline, clamshell, and loader buckets.

Adapters are made in 15 widths from 2¼ to 7 inches. The replaceable tooth has a tongue that fits into a groove on the adapter, and the arrangement is locked securely by means of two pins. The adapter is welded to the old tooth after the latter has been burned down to adapter size.

The lock pins are tapped into place with a hammer and, the manufacturer reports, are easily removed when the Bulldog tooth must be replaced. The manufacturer also reports that extensive testing has shown that Bulldog teeth will last up to 10 times longer than conventional teeth.

Bulldog replaceable digger teeth lock into an adapter that is welded on the old tooth after the latter has been burned down to adapter size.

For further information write to Allied Steel & Tractor Products, Inc., 7835 Broadway, Cleveland 5, Ohio, or use the Request Card at page 18. Circle No. 144.

The return postcard at page 18 will bring you helpful equipment data.

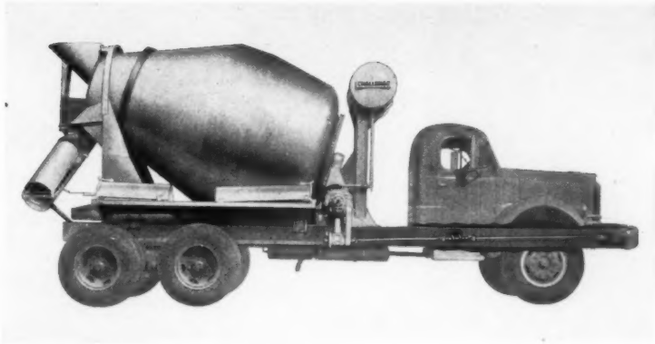
New mixer line features power takeoff from front

■ A new line of transit mixers operated through automotive-type drive lines by an improved power takeoff at the front of the truck engine is announced by the Challenge Mfg. Co. The new Challenge ETO mixers are available with capacities of 5, 5½, 6, and 6½ cubic yards.

The new Challenge ETO drive is said to mount easily on any conventional truck. According to the manufacturer, it permits the use of trucks with shorter wheelbases. It is mounted inside the front bumper, and the drive line is mounted along the outside of the truck frame.

According to the manufacturer, the Challenge ETO is more economical to operate than separate-engine mixers. All parts of the power takeoff, the input drive assembly, and the linkage are easily accessible for lubrication and other maintenance.

For further information write to the Challenge Mfg. Co., 1849 E. Slauson Ave., Los Angeles, Calif., or use the Request Card at page 18. Circle No. 142.



This new 6½-cubic-yard Challenge transit-mixer is powered by an improved power takeoff from the front of the Reo truck engine.

Electric plants; engines

■ Electric plants and air-cooled engines, manufactured by D. W. Onan & Sons Inc., are described in a pamphlet from the firm. According to the specifications, the electric plants, either gasoline or diesel engine-driven, operate on ac or dc, and the entire unit is encased in a sheet-metal enclosure. The air-cooled engines, either gasoline or diesel powered, have a horsepower rating up to 15. Case histories and job photos are included in the pamphlet.

To obtain the pamphlet write to D. W. Onan & Sons Inc., University Ave. S. E., Minneapolis 14, Minn., or use the Request Card that is bound in at page 18 of this issue. Circle No. 56.

Film on wire rope

A 30-minute sound-color film, "Quality Unlimited", describing the manufacture of wire rope, is available from the Colorado Fuel & Iron Corp. The film shows all the operations in the production of wire rope, from basic steel making to the testing of the finished rope.

Special emphasis is given to the chemical and physical tests accompanying the manufacturing process, and data is given regarding the applications and proper care of wire rope.

Information on obtaining copies of the film may be had by writing to the Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.

Broken rock is dumped into the Buchanan jaw crusher by one of the Euclid 16-yard end-dumps hauling from the quarry. The jaw crusher turns out rock up to 7 inches in size, which is carried by conveyor to a surge pile. *C&E Staff Photos*

Contractor operates quarry for own jobs, commercial sale

A quarry setup producing an average of 230 tons of stone per hour is supplying the needs of its contractor-owner—Nello L. Teer, Durham, N. C.—and enabling the firm to market aggregate commercially.

The plant, which last year produced more than a half-million tons of aggregate, is located on a 60-acre tract north of Durham. It obtains its raw materials from a pit covering more than five acres and averaging 100 feet deep.

In the pit, located near the aggregate plant, drilling is handled by two Gardner-Denver Air Tracs and a Joy drill mounted on a Ford tractor. An Ingersoll-Rand and two Chicago Pneumatic air compressors—all with 600-cfm capacities—supply the air requirements of the drill rigs.

Rock blasted from the pit is loaded by a shovel with a 2½-yard bucket to three Euclid 16-yard rear dumps that haul to the plant. If the rock requires further reduction before going to the plant, it is broken up by a 5,200-pound ball hammer handled by a Marion crane. This eliminates the need for secondary drilling.

At the plant, the haul rigs back up an earth ramp and dump the rock into a Buchanan jaw crusher powered by a Caterpillar D364 diesel. The crushed rock has a maximum size of 7 inches as it leaves the crusher to be picked up by a 332-foot-long and 32-inch-wide Quaker Rubber continuous conveyor belt and dropped to a surge pile. This pile is formed over a corrugated pipe tunnel that houses a 30-inch Quaker Rubber belt leading to the first of two crushing and screening setups.

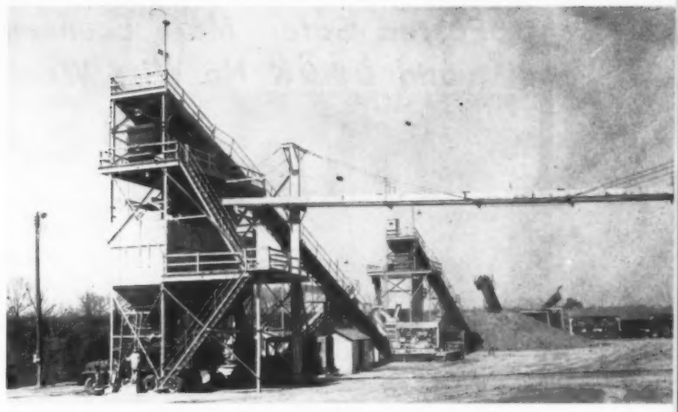
Primary crushing and screening

The crushed rock, with a Los Angeles wearing index of ten, first goes to a Telsmith double-deck vibrating screen that separates the stone into three sizes. Oversize stone from the top 2½-inch screen falls into a Telsmith 4¼-inch crusher which breaks the rock down further and deposits it on a 24-inch return feed belt leading back to the main 30-inch belt.

Rock retained on the lower 1¼-inch screen is fed through a chute to a second Telsmith crusher. This crusher deposits rock directly on a 30-inch belt feeding the secondary crusher setup.

The rock that passes through both of the screens in the double-deck arrangement bypasses both crushers to

Rock recovered from the surge pile goes to the primary crusher, a Telesmith double-deck vibrating screen with two Telsmith crushers. Oversize is further reduced before being fed to the secondary crusher by a Quaker Rubber conveyor belt.



Last in line is the setup consisting of a Telsmith triple-deck vibrating screen, a Telsmith crusher, an 18-inch return feed belt, and two butler 45-yard storage bins. All conveyor belts are Quaker Rubber.

be chuted onto the 30-inch secondary crusher belt.

Final crushing

This second 30-inch continuous conveyor belt brings crushed rock 322 feet from the primary crusher to a Telsmith triple-deck vibrating screen that again separates the rock.

Oversize stone off the top 2-inch screen or the second 1¼-inch screen can be made to feed into a third Telsmith crusher that is set to take up to 2-inch stone. Material leaving this crusher is deposited on an 18-inch return belt feeding the main 30-inch secondary belt. The bottom or sand screen is used only when it is required.

Water is sprayed on the screens in this final crusher setup to remove the fines from the aggregate. This water, pumped from a man-made 6-acre lake, goes through a 10-inch line feeding a system of nozzle sprays at a rate of 2,400 gpm. Fines as well as the water are caught in a tub leading into a 12×18-inch enclosed chute that empties by gravity into a settling basin adjacent to the lake. Once the fines have settled, water is allowed to flow back into the lake through two 24-inch lines. This keeps the lake free of all fines removed in the second set of screens.

Crushed stone is finally deposited in two Butler 45-yard bins, each of them having three compartments for the storage of two sizes of sand and stone. Two trucks, making deliveries to a customer or to the stockpiles in the quarry, can load simultaneously at these bins. In the quarry, two Pettibone-Mulliken front-end loaders, with 4-ton-capacity buckets, load the material from the stockpiles to dump trucks. These loaders, equipped with Goodyear tires, are powered by a GM diesel engine.

Power

Each of the three crushers is powered by individual Caterpillar diesel engines; electric power for other equipment at the site is supplied by two Caterpillar D397 electric sets that are housed in a centrally located building.

The twin electric set supplies 440-volt power to the various vibrating screens, quarry lighting setups, and the Barber-Greene conveyor belt motors and reducers. It also powers a Hetherington & Berner 70-ton-per-hour asphalt plant and a pugmill

(Concluded on next page)

No. 3 stone from the quarry's stockpiles is loaded out to a dump truck by a Pettibone Mulliken front-end loader with a 4-ton-capacity bucket. Two such units work around the stockpiles. *C&E Staff Photo*

(Continued from preceding page)

setup. The latter, set up to turn out a stabilized aggregate base-course material for the relocation of U. S. 15 around Durham, will be supplied with material produced at the site.

The pugmill itself is located between sand and rock stockpiles so that a Lima and a Marion crane, each equipped with 2-yard clamshells, can load the Blaw-Knox bin supplying the pugmill. Sand and stone will be deposited on the Quaker Rubber conveyor belt feeding the pugmill. The pugmill, company-built and designed to side-load two trucks at a time, has hydraulically operated controls permitting a 1-ton batch of sand and stone mixture to be dumped into waiting trucks every second.

Personnel

Robert G. Moore is the quarry superintendent for Nello L. Teer Co., which has 33 men working a 9-hour, 5-day week to operate the aggregate-producing setup. THE END

Bituminous plant

■ Model H15, a 1,500-pound batch-type bituminous mixing plant, is detailed in a bulletin from the Iowa Mfg. Co. According to the bulletin, the plant delivers from 35 to 60 tons per hour. Flow diagrams, a description of the simplified controls, engineering details, and data on the component parts of the plant are included in the bulletin. Auxiliary equipment is also detailed.

To obtain Bulletin AP-23 write to the Iowa Mfg. Co., 916 N. 16th St., Cedar Rapids, Iowa, or use the Request Card at page 18. Circle No. 45.

Power units

■ Engines for mobile and stationary powered equipment are detailed in a catalog from the Ford Motor Co. Complete specifications are given on one diesel engine and five open-head valve engines. The advantages of a short-stroke engine are listed. The outstanding features of the engines are described; and information is provided on the accessories available.

To obtain Form No. IE-7613 write to the Ford Motor Co., 3000 Schaefer Road, Dearborn, Mich., or use the Request Card at page 18. Circle No. 38.

Under an Army Engineers contract, Southern Roadbuilders, Inc., Augusta, Ga., is general contractor for this section of work at MacDill Air Base.

◀ Two new Payloader tractor-shovels feature power-shift transmissions.

New tractor-shovels have power-shift transmission

■ A pair of tractor-shovels incorporating power-shift transmissions that eliminate the necessity of even slowing down for a range shift is announced by the Frank G. Hough Co. The Model HH Payloader has a payload capacity of 1¾ cubic yards (1⅓-cubic yards struck) and the Model HU has a payload capacity of 1⅓ cubic yards (one-cubic-yard struck).

The Hough-designed Paylomatic power-shift transmission permits all shifts in both forward and reverse to be made without reducing speed. The finger-tip directional control can be operated under full engine speed in any gear. The torque converter gives infinite speed ratios, the manufacturer reports. Both the transmission and the torque converter use standard SAE-10 HD oil.

The four-wheel-drive, pneumatic-tired Payloaders also feature power-transfer differentials which provide the best traction under all conditions, according to the manufacturer, by automatically transferring additional torque to the wheel with the best footing. Heavy-duty planetary final drives in the wheel hubs and hypoid differential gearing keep a low torque in the axle and prolong the life of all the drive train parts, it is reported.

For further information write to the Frank G. Hough Co., 822 Seventh Ave., Libertyville, Ill., or use the Request Card that is bound in at page 18. Circle No. 134.

New Homelite factory placed under construction

Homelite, Port Chester, N. Y., a division of Textron, Inc., starts construction of its 135,000-square-foot factory near Gastonia, N. C., this month. The new plant, expected to be in full operation next fall, will produce gasoline-powered chain saws.

The new $2 million facility will rise on a 62-acre tract two miles south of Gastonia. Homelite will continue to produce gasoline-engine-driven pumps and generators at its present factory. All sales and engineering functions will also be continued in the Port Chester main office, which is currently being enlarged.

The Model 12-40 Con-Vay-It is available in lengths of 20, 30, and 40 feet.

Conveyor elevates 20 feet while at 30-degree angle

■ Elevations up to 20 feet at a 30-degree angle are reported with a new 40-foot portable conveyor available from the American Conveyor Co. The 12-40 Con-Vay-It concrete conveyor is available in 20, 30, and 40-foot lengths, plus combination lengths for tandem use.

Powered by a Wisconsin 9-hp gasoline engine, the conveyor can pour a yard of concrete per minute in a horizontal position, the manufacturer reports. The unit can be equipped with a High-Boy elevating device and complete assemblies, to permit sidewise movement when pouring forms.

A snub pulley is used to add to belt power. The pulley design prevents packing of concrete. Front and rear swivel frame wheels serve the needs of horizontal conveying on slab pours.

For further information write to the American Conveyor Co., 2133–37 S. Christiana Ave., Chicago 23, Ill., or use the Request Card at page 18. Circle No. 18.

Pipe pushing

■ Power pipe-pushing for underground installation of rigid and flexible pipe or conduit is explained in a bulletin from Mercury Hydraulics, Inc. Described and illustrated are the methods of installing conduit and oversize and sewer pipe. Preparation of the pipe pusher for use and preparation of the access trench are also detailed. The care and maintenance of the pusher conclude the bulletin.

To obtain the bulletin write to Mercury Hydraulics, Inc., 2440 Blake St., Denver 5, Colo., or use the Request Card at page 18. Circle No. 53.

Presstite-Keystone news

The Presstite-Keystone Engineering Products Co., St. Louis, Mo., has purchased a plant for the production of a joint sealing compound for jet airfields. The property, covering four acres in the Central Industrial Drive area of St. Louis, has two buildings and three 10,000-gallon blanding tanks.

A leaky, eroded concrete wall is repaired with Permagile, an epoxy-based poly-plastic alloy.

Spallage, cracks repaired with poly-plastic alloy

■ An epoxy-based industrial poly-plastic alloy reportedly capable of welding concrete, brick, cement and cinder block, tile, and other masonry building materials with a bond stronger than the joined material itself is announced by the Permagile Corp. of America. It is particularly recommended for permanently repairing severe spallage and cracks in concrete structures.

Permagile can also be used for surfacing heavy-duty roadways, according to the manufacturer. Special formulations are available for each of its three main functions—joining, filling and cladding. It has a compressive strength of 35,000 psi and a tensile strength of 8,000 to 10,000 psi. It completely resists water pressure up to 30 psi and its water absorption is 0.13 per cent.

Although rigid, Permagile has an elasticity 30 to 40 times that of concrete, the manufacturer claims. It is unaffected by temperatures between minus 20 and plus 270 degrees F. In recent tests, the manufacturer states, a cinder block butt-welded to a wall with Permagile carried 500 pounds without breaking loose.

For further information write to the Permagile Corp. of America, 37-23 33rd St., Long Island City 1, N. Y., or use the Request Card at page 18. Circle No. 132.

Second volume published on irrigation engineering

Engineering information on all aspects of irrigation projects, conduits, and dams has been compiled in volume 2 of "Irrigation Engineering" by Ivan E. Houk. The book emphasizes the practical requirements that must be kept in mind in evaluating, planning, and constructing irrigation projects.

Federal irrigation projects, officials in the U. S. Bureau of Reclamation, journal articles, and the experience of the author form the basis of information for the book. Topics covered in the book include flumes, pipes, and tunnels on irrigation projects; canals and ditches; diversion and storage dams; spillways and outlet works at dams; and gates and valves at irrigation structures.

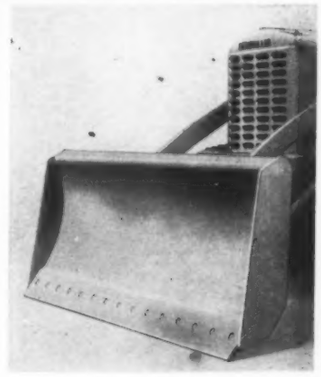
Priced at $14, the book may be purchased from the publisher, John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y.

Straight bulldozer blade features 104-inch width

■ A new 104-inch-wide straight bulldozer blade attachment for the No. 977 Traxcavator has been announced by the Caterpillar Tractor Co. It is recommended for the leveling, clean-up, and backfilling operations usually accomplished with the Traxcavator bucket.

The new attachment fastens to the lift arms with a bracket arrangement at the same point where the bucket connects. The blade is easily adjusted.

There are now two different dozer arrangements for the No. 977: the new straight blade and the previously introduced No. 977A angling-blade bulldozer.



For further information on the straight blade write to the Caterpillar Tractor Co., Peoria, Ill., or use the Request Card at page 18. Circle No. 4.

The new truck-mounted earth-boring machine with hydraulic turntable base, manufactured by the Highway Trailer Co., can dig a series of holes at any angle without the truck itself having to move. It can bore holes from 9 to 36 inches in diameter and up to 10 feet in depth.

New rotating earth borer mounts on turntable base

■ A truck-mounted earth-boring machine with a hydraulic turntable base and a swivel action that permits operation at any angle over a 180-degree arc without moving the truck is announced by the Highway Trailer Co. The rig is capable of digging holes of from 9 to 36 inches in diameter and up to 10 feet in depth.

The rig can also be adapted to pole placing by the attachment of an integral winch and derrick apparatus. Poles of from 40 to 45 feet in length and weighing from 2,000 to 2,500 pounds can be lifted and set, the manufacturer reports; on some models a telescoping derrick with a 3,500-pound-capacity can be used.

Among the advantages of the swinging turntable unit are that it can be operated to either side of the truck, as well as to the rear; it can get at places inaccessible to rigs that will only work from the rear of the truck; and a series of holes can be dug at any angle within the earth-borer's operational arc without moving the truck.

For further information write to the Highway Trailer Co., Edgerton, Wis., or use the Request Card at page 18. Circle No. 10.

Ripper attachment rips outside grader's width

■ A tool designed for ripping outside the width of the wheels or outside the cutting width of the blade of a motor grader is announced by the Swanson Mfg. Co. The Swanson ripper is a specially designed attachment support boot that holds a standard-make ripper shank.

The tool is recommended for use in ripping asphalt, hardpan, stratified rock, shale, adobe, and concrete of a reasonable thickness, the manufacturer reports. It is said to be effective in tight places and is particularly advantageous for cutting close to stakes.

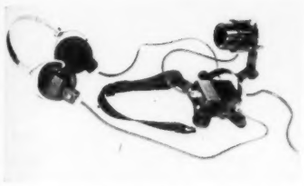
The Swanson ripper fits the Caterpillar No. 12 motor grader.

The Swanson ripper is available in two models, both for use on the Caterpillar No. 12 motor grader. On the Model 10, the ripper shank is inserted with the point up when it is not in use. On the Model 20, the attachment support boot is movable on the moldboard frame; it slides over out of the way when not being used.

For further information write to the Swanson Mfg. Co., 515 63rd St., San Diego 14, Calif., or use the Request Card at page 18. Circle No. 137.

Bruning Co. builds plant

Charles Bruning Co., Inc., Chicago, Ill., has started work on a $3-million plant and office building in Mount Prospect, Ill. Located on a 30-acre site, the plant will have 307,100 square feet of space, and the office will have a 38,750-square-foot area. The new structure will replace the company's two separate Chicago plants. Occupancy is scheduled for July 1, 1957.



A USI sound-powered head-chest set allows the operator to have both hands free. It is recommended for use by equipment operators.

Sound-powered telephone transmits up to 30 miles

■ Telephone systems with up to 16 stations, in which the voice of the user supplies all the power necessary for operation, are available from the United States Instrument Corp. According to the manufacturer, satisfactory transmission of 30 miles or more is possible under normal conditions.

The sound-power principle of operation is based on an alternating current created by the fluctuations in the magnetic circuit of the transmitter caused by the user's voice. The tiny current is transmitted to the receiver where sound waves are created, reproducing the speaker's voice.

The manufacturer states that the voice is transmitted clearly and distinctly without any distortion because all the static noises usually associated with battery-type telephones are eliminated. Since the magnetic properties of the Alnico magnets which form the heart of the USI sound-powered instruments remain virtually constant, the manufacturer reports, these instruments have an unlimited useful life.

For portable use, ordinary rubber-covered electrical extension cord with two copper conductors, insulated and twisted into pairs, is recommended. Performance is not affected by polarity. Separate equipment and wiring should be used if ringing is required.

The USI sound-powered telephone systems are recommended for use on construction jobs, batching plants, and wherever electric current is not easily accessible. Several USI models bear the approval of the Bureau of Mines, U. S. Department of the Interior.

For further information write to the United States Instrument Corp., Route 209 North, Charlottesville, Va., or use the Request Card at page 18. Circle No. 146.

Infiltration gaskets

■ Rexon K gaskets, rubber joints for coupling standard small diameter bell and spigot concrete sewer pipe, are described in a brochure from the Hamilton Kent Mfg. Co. Job photos show that the gaskets are flexible, watertight, and non-deteriorating. According to the specifications, the gaskets are for pipe from 4 to 24 inches in diameter. Engineering data, diagrams, and application methods are included in the brochure.

To obtain Form No. 5M-5027 write to the Hamilton Kent Mfg. Co., 427 W. Grant St., Kent, Ohio, or use the Request Card at page 18. Circle No. 44.

Corps of Engineers names Col. Wm. Lapsley to post

Col. William W. Lapsley, chief of the supply and maintenance division, Office of the Engineer, Headquarters Army Forces Far East, is the new commanding officer of the Engineer Maintenance Center, Columbus, Ohio. He succeeds Brig. Gen. Miles M. Dawson, who retired.

Col. Lapsley is a graduate of the United States Military Academy at West Point; the Engineer School, Fort Belvoir; the Armed Forces Staff College; and the Army War College.

During World War II he served in the Mediterranean and European Theaters of Operation, and later became assistant chief of the Installations Branch at the Pentagon.

The Kansas Turnpike, which opened last month, will have no speed limit. However, drivers exceeding 80 mph will be stopped. It will be illegal to drive less than 40 mph unless bad weather or other factors make is advisable for motorists to do so.

The new Silent Glow portable space heater.

Portable heater delivers heat in quantity

■ A new portable oil heater said to deliver one million Btu's per hour or 7,000 cfm of heated air is announced by The Silent Glow Oil Burner Corp. The heater is recommended for use in foundation and brick work where high-velocity, high-temperature air is needed in quantity and where complicated ducts are not usable. It is also recommended for use in drying sand and other concrete aggregates.

A 4-blade fan on the front end of the heater forces out the hot air produced by the oil burner at the opposite end. The space heater's combustion system insures complete combustion because the fuel is being constantly reburned within the flame of the burner itself, the manufacturer reports.

The heater, 8 feet 9 inches long, 4 feet high, and 34 inches wide, weighs 900 pounds. The combustion chamber is made of stainless steel. The heater will burn 7 gpm of No. 2 fuel oil, No. 1 fuel oil, or kerosene, using an independent fuel supply tank.

For further information write to The Silent Glow Oil Burner Corp., 850 Windsor St., Hartford, Conn., or use the Request Card at page 18. Circle No. 94.

Equipment selector shows productivity

■ An equipment selector slide rule is now available from the Prime-Mover Co. The rule shows the productivity per man hour, the labor rates, and the cost per yard of placing concrete for various distances of pours with the use of wheelbarrows, hand carts, and the Prime-Mover Model 15A. The information is said to be based on average job conditions.

To obtain the slide rule write to the Prime-Mover Co., Sampson St., Muscatine, Iowa, or use the Request Card at page 18. Circle No. 61.

Illustrated guide to motor grader operation

■ A guide to motor grader operation is available from the Caterpillar Tractor Co. Topics covered are blade movement, basic and extreme blade positions, maneuvering, flat-bottom and V-ditches using the basic positions, and working in reverse. Information is also included on the basic maintenance and operating speeds of a grader. The manual, well illustrated with color pictures, is also available printed in Spanish, French, and Portuguese.

To obtain Form No. DE628 write to the Caterpillar Tractor Co., Peoria, Ill., or use the Request Card that is bound in at page 18 of this issue. Circle No. 31.

Hewitt-Robins division appoints chief engineer

Wesley H. Raff has succeeded Henry F. Dischinger as chief engineer of the Robins Engineers Division of Hewitt-Robins, Inc. Dischinger, who has retired, will continue to serve the firm as a consulting engineer. Raff has been with Hewitt-Robins since 1926.

The Rosco Model SR-9-0 self-propelled road roller.

Roller with nine wheels has 13-foot turn radius

■ A self-propelled, nine-wheel, pneumatic-tire roller with a 13-foot turning radius is announced by the Rosco Mfg. Co. The Model SR-9-0 is a 9-ton rig with five forward and two reverse speeds.

The unit, powered by a 4-cylinder, high-torque engine, runs on gasoline and is liquid cooled. Four oscillating wheels and a bolster assembly are in the front of the rig, while the five driving wheels are in the rear. Smooth tires give a 69-inch rolling path with overlap.

For further information write to the Rosco Mfg. Co., 3118 Sneeling Ave., Minneapolis 6, Minn., or use the card at page 18. Circle No. 101.

Steel Structures issues bulletin on painting

Steel Structures Painting Council has issued a "Painting Bulletin" reporting the results of paint testing, abstracts of pertinent technical articles, investigations of paint failures, and data on successful paint jobs.

The Council is a non-profit research organization that aims to promote the protection of structural steel through the use of paints and coatings.

The bulletin, well illustrated with on-the-job photos, is available from Steel Structures Painting Council, 4400 Fifth Ave., Pittsburgh 13, Pa.

L. B. Foster moves district office

The Atlanta, Ga., district office of L. B. Foster Co., Inc., Pittsburgh, Pa., has moved to a 2,500-square-foot building at 795 Peachtree St., Atlanta. Harold Ford has been appointed district sales manager, and Ronald W. Gee has been named office supervisor.

Both men have been with Foster since 1955.

Clifford B. Bronson has been made an engineering consultant to Foster's New York City office.

New line of welders has adjustable slope control

■ A new line of modified constant voltage welders, consisting of 300, 500, 750, and 1,200-amp machines, is announced by the Harnischfeger Corp. The main feature of the new P&H machines, according to the manufacturer, is an adjustable slope control.

The adjustable slope control is said to give a softer arc, eliminate burnback and stubbing, and provide a stable, spray-type deposit when properly adjusted for aluminum, stainless steel, and other alloys. Also, the slope control is valuable in smoothing out both semi-automatic Unionmelt and open-arc steel welding, the manufacturer reports.

For further information write to the Harnischfeger Corp., Welding Division, 4400 W. National Ave., Milwaukee, Wis., or use the Request Card at page 18. Circle No. 83.

labor review

Except for the construction sites themselves, the boom towns that were expected to develop in the vicinity of the St. Lawrence Power and Seaway Project have not materialized. There has been little discernible change in the rural and suburban atmosphere of the area despite the sudden influx of workers and money. Although the huge project is, economically, the biggest thing to happen to the area since it was settled two centuries ago, such towns as Massena, Ogdensburg, Potsdam, Winthrop, and Malone have retained their placid characteristics and have not taken on a Wild West or Gold Rush aura.

Naturally, the project has had a visible influence on the life and economy of the area. The addition of about $40 million yearly in the pockets of workers has brought about a 100 per cent increase in the labor force of retail trade and service establishments in the city of Massena, near which most of the construction is taking place. The New York State Department of Labor's monthly "Industrial Bulletin" estimates that a gain of about half that much has been recorded by other communities in the area.

Except for housing, the cost of living has not materially increased. The price of groceries has remained close to the national average. Alcoholic beverages, an increasingly important part of the retail economy, have remained fairly constant in price. Although food prices have not gone up, restaurant prices have risen 10 to 20 per cent.

Rents in Massena, which has a population of 13,000, have as much as tripled on houses and apartments, and the average price of a single room in a hotel, rooming house, or private home has increased 25 per cent. The housing shortage, although still acute, has been alleviated to some extent by new construction, trailer camps, and the availability of rooms in private homes, which have never before been offered for rent.

According to the "Industrial Bulletin" 65 per cent of the work force on the St. Lawrence Project is composed of common laborers, most of whom are local men from St. Lawrence and Franklin Counties. The Department of Labor's monthly news magazine reports that there is virtually no unemployment among males during the construction season. Generally, contractors have been more than pleased to hire every available able-bodied man. When the river freezes and activity is curtailed, the men that are laid off usually are content to collect their unemployment compensation until the upswing of employment begins in the spring. Industries in the area have not found it advisable to expand their activities during the winter to take up the employment slack.

Roughly 6,700 men were on the job in supervisory and non-supervisory positions on the American side of the $900 million project at the peak of the 1956 construction season. This number has dropped to about 3,000 at present. As the ice and snow begin to thaw and the temperatures rise, the work force will be increased until a high in excess of 7,000 is reached next summer. When construction enters the critical stage in 1958, it is expected that almost 8,000 men will be on the payrolls.

Most of the non-local men working on the St. Lawrence project in 1956 —they made up almost half of the working force—were from the cream of the nation's crop of skilled construction labor. These men follow the big jobs around the country, working wherever they are needed. In many cases, the pay rates in their collectively-bargained contracts are as much as 25 per cent higher than the prevailing wage scales established by the New York State Department of Labor. Probably the actual rates will go even higher when present contracts are renegotiated.

Examples of prevailing wages by the Department of Labor are: piledrivers, $3.075; millwrights, $3.025; cement workers, $3.35; electricians, $3.15; ironworkers, $3.30; beginning operating engineers, $1.50; experienced operating engineers, $3.10; and pipefitters, $2.84. It is estimated that from ½ to ¾ of the $450 million that the United States will pay as its share of the project's cost will go into pay envelopes.

The fact that the project is being financed by interest-bearing revenue bonds, coupled with the fact that bidding has been sharply competitive—one joint-venture firm lost a $26 million contract by a scant $26,000—has made it imperative that operations move along on schedule. During the early stages of construction, jurisdic-

tional differences—a major cause of strikes—were many. In the first year and a half of construction, several strikes were threatened and a few "fishing expeditions" were organized. These expeditions take place when a group of workers decides to go on a fishing trip until a labor dispute is resolved.

Labor leaders from as far away as Syracuse, N. Y. set down with the contractors during the winter of 1955–56 and, in a series of meetings, succeeded in ironing out all major jurisdictional wrinkles. The minor disputes that still crop up are effectively handled by the Labor-Contractors Office, which acts as a labor relations liaison between the contractors and the unions.

Of the three work stoppages that have taken place up to now on the St. Lawrence Project, only one was the result of a real union-contractor dispute. It began on March 12, 1956, and involved 1,400 operating engineers. Approximately 1,600 other workers in various construction trades refused to cross the operating engineers' picket lines, effectively halting work on the project. The primary cause of the walkout was a disagreement over the extent of work to which any newly negotiated contract would apply.

The strike decision by Local 545, International Union of Operating Engineers, came about after nine weary months of negotiations for a contract to replace one whose expiration date was January 1, 1956. When the negotiations began in July, 1955, they were conducted between the operating engineers and the Associated General Contractors. Later, direct representatives of the six prime contractors involved in the dispute took over the collective bargaining from the AGC. In mid-February of this year, it appeared that a general agreement on a two-year contract that would increase wage rates more than 30 cents per hour over the life of the contract had been reached. The question that remained concerned what work the new contract would cover.

Local 545 believed that the new rates should be applied to all work started under the old contract as well as to work started in 1956. But the contractors maintained that, by a carry-over clause in the old contract —negotiated through an AGC chapter —the union had already agreed that new rates would not apply to work started in 1955, but only to jobs initiated in 1956. The contractors argued that they had a legal obligation to the AGC to enforce the carry-over clause in the old contract and would be liable to an action by the AGC if they didn't enforce it.

Mediation sessions under the supervision of the New York State Board of Mediation began in the offices of the Board two days after the men decided to walk away from their jobs. Agreement was reached after four days of mediation and the men went back to work. The strike had lasted seven days.

The accord called for a wage differential between work started in 1955 under the old contract and work began in 1956. As of January 1, 1957, however, wage rates for comparable work will be equalized, regardless of the starting date of the jobs.

The two other work stoppages did not involve actual labor disputes on the St. Lawrence Project. Members of the International Brotherhood of Electricians put down their tools when their contract with the project's electrical subcontractors inadvertently was allowed to lapse. The men walked away from their jobs because of a "no contract, no work" union clause. It took three days to draw up a new agreement and get it signed. Then, the men returned to their jobs.

A deadlock in negotiations for a new contract between the Licensed Tugmen's Protective Association and the Great Lakes Dredge Owners Association slowed work on the St. Lawrence Project when 2,000 workers refused to cross the tugmen's picket lines. The workmen were employed in the construction of the St. Lawrence deep waterway channel. The tugmen were fighting for a retroactive wage increase, for an improved hospitalization plan, and for use of an extra man on launches of more than 150 horsepower. The old contract between the tugmen and the dredge owners had expired on March 31, and the walkout commenced two weeks later. It lasted less than a week.

A minor problem encountered during the early days of construction concerned Canadians who attempted to work on the American side where the wages were higher. This illegal practice has been just about stopped.

A Bucyrus-Erie 54-B shovel with a 3½-yard built-up bucket loads one of the seventeen 10-yard trucks hauling material for the fill along the Cocheco River.

Spaulding turnpike is big earthmoving job

High fills constitute some of the more difficult work being done on New Hampshire's new Spaulding Turnpike by R. G. Watkins & Sons, Inc., Amesbury, Mass. This pike, with two 24-foot lanes separated by a 12-foot median, is a 22-mile addition to the Seacoast Turnpike that will connect with State Route 16 north of Rochester, N. H., near the White Mountain area.

Watkins is building part of the addition near Dover. At present the firm has two contracts under way—a 3.3-mile section which is nearing completion, and a 1.1-mile section that calls for a stone fill along the Cocheco River paralleling the turnpike, and an interchange with State Routes 4 and 9.

Most of the 53,000 cubic yards of common excavation in the fill area on the shorter section was done by a Bucyrus-Erie 38-B, powered by a Caterpillar D342 engine, that was equipped with a 1½-yard bucket. An additional 10,000 cubic yards of material is being excavated by a Bucyrus-Erie 22-B backhoe with a ¾-yard bucket. This machine, powered by a Cat D318 engine, is excavating for 900 feet of an 18-inch drainage ditch that will carry water out of the pedestrian pass. Cuts are averaging 7 to 13 feet deep.

The 1,080,000 cubic yards of common borrow required for the fill is being taken from an area about a mile from the job site, where two shovels are averaging better than 650 loads daily to fourteen Mack and three White 10-yard trucks. One of these rigs is a Koehring 605 powered by a Cat D342 engine and equipped with a 1¾-yard bucket. The other is a Bucyrus-Erie 54-B with a 3½-cubic-yard built-up bucket. This rig is powered by a D337 torque-converter-equipped engine.

In addition to the common borrow, 70,000 cubic yards of gravel borrow

In another part of the pit, a Koehring 605, powered by a Cat D342 engine, empties its 1¾-yard bucket to a 10-yard Mack truck.

A Caterpillar D7 moves up to spread material being dumped by a truck near the interchange with State Routes 4 & 9. This stretch of the 22-mile addition to the Seacoast Turnpike is scheduled to be finished June 1.

High fills are built along river and at intersecting roads; 1,580,000 yards of borrow used

and 30,000 cubic yards of crushed gravel are being placed on this section. Also at work with this spread are two Cat D8 tractors, three D7's, and a TD-24—all equipped with bulldozers—a Michigan 175A loader and a No. 12 motor grader. About 10,500 tons of bituminous paving will be required on this short stretch, which is scheduled for completion June 1.

Fills for intersecting roads

High fills also were the rule on the 3-mile section which Watkins has almost completed. In one area, Watkins had to put in a 65-foot fill to clear the Boston & Maine Railroad tracks. Several other large fills are necessary, because all intersecting roads—excluding State Route 108—go over the highway.

A sizable amount of excavation on this project was handled by a Bucyrus-Erie 22-B, which dug 7,000 feet of 3-foot-wide and 5-foot-deep drainage ditch at the rate of 600 feet per day. Pipe installed in this ditch was of 12 and 18-inch size.

The contractor went more than 51 inches deep in laying a base on this stretch. This includes a 3-inch surface with a pervious gravel base. Gravel was obtained from a borrow pit, where a Koehring 605, powered by a D13000, loaded a Cedarapids crusher. The crusher turned out material to nine 10-cubic-yard trucks for a 1,000-foot haul. Gravel was put in the base at a rate of 1,500 cubic yards a day. Altogether, 150,000 cubic yards of gravel borrow were required under this contract. Total borrow on the stretch came to 500,000 cubic yards, and total excavation to 128,000 yards.

R. C. Freeman is superintendent on the 3-mile section for Watkins, while Frank Watkins is supervising work on the shorter stretch. THE END

Md. Roads Commission news

William F. Bender has been appointed director of personnel for the Maryland State Roads Commission. He will be in charge of all personnel activities, including recruiting and training.

For more facts, circle No. 264→

Management

This is the eleventh of a series of articles on Construction Management by George E. Deatherage, P. E., construction consultant. The articles are based on an eight-volume "Manual of Advanced Construction Management" published by Geo. E. Deatherage & Son, P. O. Box 921, Lakeworth, Fla. The manual is used in a training course for superintendents and project managers, and is directed primarily at those contractor employees who have reached the foreman level or its equivalent, and who need practical help in order to take complete charge of construction projects themselves.

The Engineering Department

Process charts and gang process charts

Valuable tools in making an analysis of field operations and office procedures are process charts and gang process charts. The former show all the steps involved in completing a specific operation or piece of work; the latter show the activities of a crew on a piece of work that will be priced separately in the estimate.

These process charts serve three purposes: to identify the labor and material units required for a piece of work; to help measure and price the labor and material items; and to analyze the proposed or present operations so that better and more economical ways of doing the job can be worked out.

Preparing such carefully detailed process charts is usually not justified unless the same or similar operation is to be repeated a number of times. There are many types of construction work in which they will be of good use, including jobs on group dwellings, multi-story construction, tunneling, and highway work. On road jobs, for instance, grading, fine-grading, form setting, concrete placing, and finishing constitute operations that can profitably be charted so that improvements can be made in work methods.

Four symbols used

Four symbols are used to plot work—a large circle, a small circle, a triangle, and a square. The large circle signifies an operation and is used for the main steps, when work is actually done. The small circle usually denotes a movement of material from one place to another. A letter may be written inside the small circle to denote the means of transportation. If a wheelbarrow was used to transport bricks, for instance, a "w" may be written inside the circle. If a man carried the bricks from one point to another, an "m" may be lettered inside the circle.

A triangle indicates a delay or storage. If it is necessary to separate temporary and permanent storage, a small "t" or "p" may be lettered inside the triangle. This symbol may also be used to indicate that a workman is being delayed because he is waiting for material he needs to do his job. The square indicates inspection for quantity, quality, or approval. If the inspection and operation itself are combined, the square may be placed inside the large circle.

These symbols may be used for process charts tracing the movement of either materials or men, but these two types of charts should not be combined except for a preliminary analysis.

A process chart for work involved in placing a concrete floor for one of a number of similar buildings in a

by **GEORGE E. DEATHERAGE, P.E.,**
construction consultant

housing project shows how some operations can be consolidated, others eliminated, the work speeded, and costs cut. The process chart for this is shown in figure 1 (A, B, C, D), which traces work involved in laying a 5-inch concrete floor with a ¾-inch topping. This slab rests on 5 inches of cinders and required 6 inches of grading to be done.

The estimator first separates the work into well defined units, then lists the time spent on each unit, the wage rate paid men working on each unit, and the cost of labor for the unit. The cubic-foot cost of materials, like cinders and cement, is also listed,

(Continued on next page)

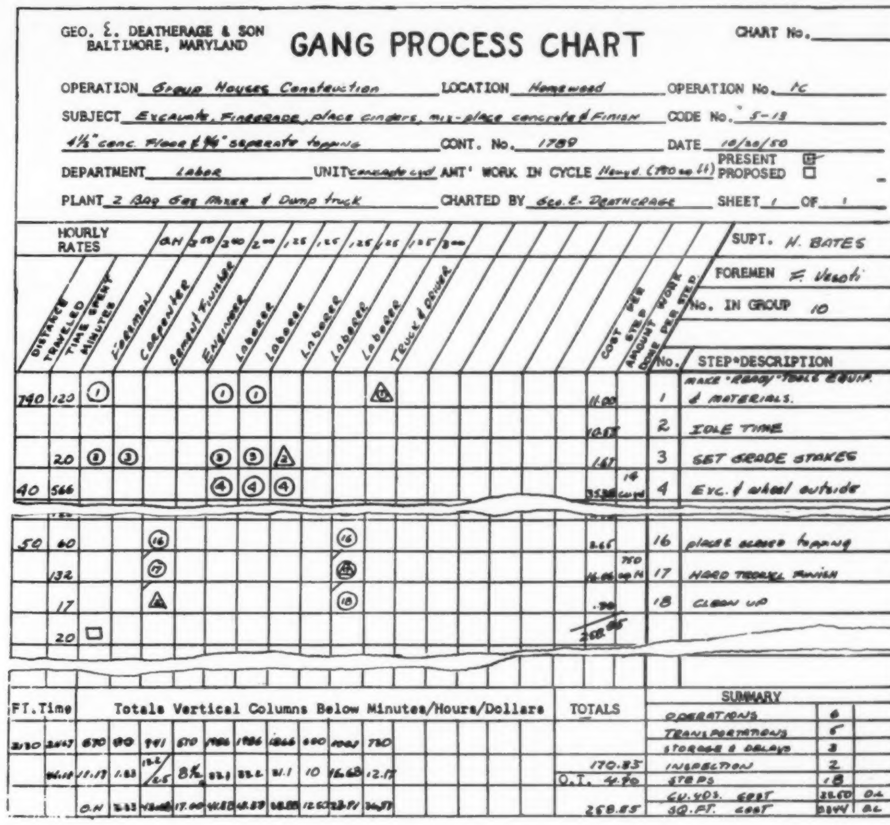


Figure 2

Geo. E. Dunhaupt & Son — INDUSTRIAL ENGINEERS — PROCESS CHART

☒ - PRESENT ☐ - PROPOSED

SUBJECT CHARTED: Group House Construction — Homewood Sub-Division, Baltimore, Maryland
OPERATION: Basement Floors, 5" Concrete
DEPARTMENT: Own Forces
DATE: 10/9/52
CHART BY: G.E.D.
CHART No.: C-12
SHEET No.: 1 OF 3

DIST. IN FEET	TIME IN MINS.	CHART SYMBOLS	PROCESS DESCRIPTION	
			Supt. approves start of floor placing	(O.H.)
			Note to Exc. & Grading foreman to start	(O.H.)
			Foreman reads instructions	(O.H.)
410			Foreman visits basements to look over site	(O.H.)
410			To shanty to order materials required	(O.H.)
			Estimates material required	(O.H.)
			Schedules dates & time material delivery	(O.H.)
40			To tool shed-arrange tools-equipment	(O.H.)
	30		Has tools selected & ready to load	(D.L.)
	21		Has conc. Mixer serviced	(D.L.)
	17		Awaits truck to load & transport	(D.L.)
	24		Loads truck tools & equipment	(D.L.)
370	11		Transports T & E to site	(D.L.)

Figure 1 (A)

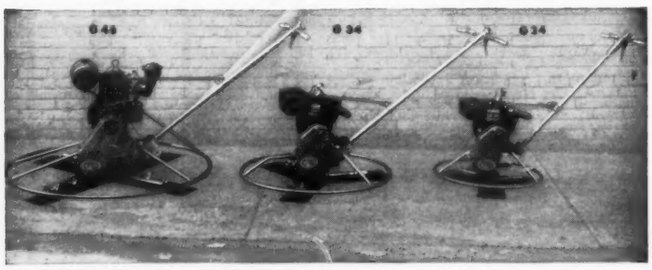
	9	Unloads tools & equipment	(D.L.)
	13	Sets mixer in position	(D.L.)
370	21	Truck to warehouse for runway plank & cement	(D.L.)
	17	Plank & Cement loaded	(D.L.)
370	11	Truck returns to site	(D.L.)
370	8	Truck unloaded & released	(D.L.)
	21	Wheelbarrow runway built to basement window	(D.L.)
	9	Cement stacked & covered	(D.L.)
370	12	To shanty for level & rod (D.L.)	(O.H.)
370	12	Returns to site with above (D.L.)	(O.H.)
	10	Makes grade stakes from scrap lumber	(D.L.)
	3	Grade stakes, level & rod to basement	(D.L.)
	5	Sets up Level (Foreman)	(O.H.)
	22	Sets grade stakes to finish floor & to drain	(D.L.)
		Laborers start fine grade to 10" below stake	(D.L.)
	640	Laborers exc. & load barrows (14 cu yds) 750 sq ft.	(DL)
30	200	Transport dirt outside to grade level (14 cu yds)	(DL)
		Foreman requests send truck	(O.H.)
370	15	Truck travels to site (Truck only)	(D.L.)
	210	Laborers load truck	(D.L.)

Figure 1 (B)

News about CONCRETE FINISHING

Here is a really smooth finishing job done on a super market floor with the STOW G-34 Roto-Trowel. Note that the operator was able to trowel right up to the walls, because of the rugged, stationary guard ring. According to men in the field, the new STOW trowel is the most advanced, best engineered trowel on the market; and it makes possible extremely smooth surfaces.

The STOW G-34 Roto-Trowel handles easily. It has many important safety features, such as the foolproof, dead-man clutch control that stops blade rotation the instant the operator releases the handle. The engine remains running, thus eliminating the necessity of re-starting the engine. For complete information about the complete line of STOW Roto-Trowels, write today!



46" Roto-Trowel — 34" Roto-Trowel — New 24" Roto-Trowel

SPECIFICATIONS

Model No.	Trowel Diameter	Ring Diameter	Engine	Trowel Speed	Float Trowels	Finish Trowels	Operating Weight
G-24	24"	25"	Briggs & Stratton 2.2 HP	35 to 130 RPM	6" x 10"		69 lbs.
G-34	34"	35"	Briggs & Stratton 2.5 HP	25 to 100 RPM	10 x 14"	6 x 14"	145 lbs.
E-34	34"	35"	G.E. Fan-Cooled 1½ HP	90 RPM	10 x 14"	6 x 14"	139 lbs.
G-46	46"	48.5"	Wisconsin - BKN 6.8 HP	25 to 100 RPM	10 x 18"	6 x 18"	212 lbs.

STOW — STOW MANUFACTURING CO.
40 Shear Street, Binghamton, N. Y.

For more facts, use Reader-Reply Card opposite page 18 and circle No. 269

(Continued from preceding page)

together with their total costs. If he follows a cost code, the estimator will make separate operations and unit prices for grading, cinders, concrete placing, and finishing. The recommended practice is to break the operations down according to the code, and estimate each operation alone.

Though each of the operations involved in laying a concrete floor may be separately priced in accordance with the code, a process analysis shows that there are a number of things involved in this job that are disregarded by the code.

The process chart shown in figure 1 shows all the moves that must be made to lay a 5-inch concrete basement floor. The chart required 1½ hours to prepare, and the labor charge involved in its preparation can be spread over the number of buildings to be constructed. In all, the chart shows a total of 36 operations, 24 transportations, nine storages or delays, and 4 inspections or approvals.

Simplifying work

The first step in developing a faster and more economical way of doing something is to secure an accurate record of what is being done now. This is provided by the process chart, in addition to identifying, measuring, and pricing all the labor and materials for the estimator's information.

An analysis of this process chart, with a view to reducing work and costs, raises some questions immediately. The first is, are the cinders under the floor really necessary? This is a controversial question, the answer to which depends on the locality in which the structures are being built, the nature of the ground, and other factors.

The need for grading 6 inches of dirt from a basement area can be questioned next. If the basement were excavated to a closer tolerance, removing the extra 6 inches of dirt would not have been necessary. The

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CLEVELAND 15, Ohio 2731 Prospect Ave.
DETROIT 27, Mich. 13801 Schoolcraft Ave.
INDIANAPOLIS 4, Ind. 309 North Capitol Ave.
MEMPHIS 3, Tenn. 268 Madison Ave.
NEW YORK 7, N. Y. 81 Murray St.
PHILADELPHIA 6, Pa. 311 North Randolph St.
ST. LOUIS 8, Mo. 4018 Olive St.
SYRACUSE 3, N. Y. 739 Montgomery St.

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	210	Truck awaits load	(D.L.)
700	140	Truck & dirt to dump	(D.L.)
370		Truck released for other work	(D.L.)
	100	Laborers complete fine grading	(D.L.)
	30	Laborers await delivery of cinders	(D.L.)
	240	Cinders shoveled in Basement window (14 cu yds(	(D.L.)
	240	Cinders spread & tamped	(D.L.)
120		Laborers to mill for screeds (120 L.F.)	(D.L.)
	20	Await screeds to be ripped	(D.L.)
120	19	Transport screeds to site	(D.L.)
230	60	Carpenter sets screeds to grade	(D.L.)
	30	Sets conc. chute in window, arrange runway	(D.L.)
		Sand & gravel delivered & unloaded	
	20	Laborers fix wheel barrow runs	(D.L.)
	30	Crew kills time to end of shift	(D.L.)
	10	Engineer starts mixer	(D.L.)
740	15	Sends to tool house for water hose	(D.L.)
	10	Crew makes ready & awaits hose	(D.L.)
	5	Hose to mixer & connected	(D.L.)
20	480	Mixer loaded & discharged to basement	(D.L.)

Figure 1 (C)

basement might have been excavated deep enough to allow for the cinders and the surplus dirt that accumulates during sewer and drain installations so that the grade would be at the desired level when cinders were ready to be put down. If anything, the excavation should have been made a little deeper than necessary, since it would be cheaper to fill in with an inch or so of cinders than to fine-grade the excavation.

Assuming that it is necessary to fine-grade, is it necessary to load the material on a truck to be hauled away from the site? If the outside grade were left low enough, it could take this material as fill. Why not put cinders down long before the floor is laid so that they will provide a drier area for men to work on? If this is done, would the men walking on them for weeks eliminate the need for tamping the cinders? These are only some of the questions that can be raised after a study of the process chart.

If it is not possible to eliminate some operations, it may be possible to combine a few to save time and money. The truck, for instance, might take surplus sand and gravel, along with tools and equipment, to the next house instead of returning for it on the cleanup. When operations have been reduced to only those that are absolutely necessary, those concerned with production and planning can study each workman's movements with a view to reducing them to a minimum.

The greatest use of the charts to the estimator is their showing clearly, and in sequence, the various moves that have to be made to compile a specified piece of work. Some estimators are so trained that they can visualize in their mind all the movements required for a particular unit of work, but others, to be on the safe side, will find the printed process chart form a dependable tool that reveals every possible contingency on a job. In analyzing the charts, the estimator or analyst will automatically attempt to reduce the number of operations to a minimum. It is a good practice to indicate at the extreme right hand of the sheet whether the work charted is an overhead item (OH), the cost of which is not figured in the work unit or the job as a whole, or direct labor (DL) the cost of which is included in the estimate. The two squares at the top of the process chart, marked "Proposed" and "Present", identify the charts as being records of work being done or records of the way work will be done. In working out a chart to improve the method of doing a job, a "Proposed" process chart is used, based on a "Present" process chart.

Gang process charts

Gang charts, using the same symbols as process charts, simply show job operations in which more than one man and more than one trade are involved. Each individual member of a gang on a piece of work has his

27			Concrete spread to far corners (D.L.)
			Cement finishers screed to grade (D.L.)
			Pull screeds (D.L.)
			Fills screed holes (D.L.)
			Gives surface rough floating (D.L.)
			Waits on water to leave concrete (D.L.)
			Helper makes ready to mix topping (D.L.)
			Labor crew awaits truck & cleans up (D.L.)
			Tools & equipment loaded (D.L.)
80			Transports to next house (D.L.)
40	30		Cement Fin. helper mixes topping(750 sq.ft) (D.L.)
	15		Topping transport to basement (D.L.)
	48		Topping spread & screeded (D.L.)
	20		Topping floated in place (D.L.)
	60		Awaits topping to dry (D.L.)
	60		Trowels topping (Overtime) (D.L.)
	18		Finisher laborer cleans up (D.L.)
	15		Foreman inspects and approves (O.H.)
	20		Truck to clean up (D.L.)
	10		Surplus material etc. removed (D.L.)

Figure 1 (D)

(Continued from preceding page)

movements charted by the four symbols. These symbols, as shown in the gang chart in figure 2, are set down side by side on a line labeled with the work performed. Steps in the operation are numbered, and numbers placed inside each symbol on a line correspond to the work described for that line. If step No. 11 covers "mixing and placing concrete", all the symbols for the men on line No. 11 are filled in with number 11. In figure 2, however, two of the men were already doing step No. 12, "screed to grade", so number 12 was entered in the symbol for these two men on line 11.

A gang chart like the one shown in figure 2 makes it possible to calculate the complete work cycle for a particular job, like laying a 5-inch concrete basement floor, together with the cost of each step in the process. The work accomplished is posted at the top of the sheet under "Am't work done".

The gang chart shown here includes overhead employees, laborers, mechanics, and truck drivers, all of them working at various rates. This chart shows all their functions performed in putting down the floor. The job of each workman is shown separately for the whole operation.

As with process charts, gang charts are not warranted unless the combined operation is to be done a great many times. In addition to preparing a gang chart for an entire operation, like putting down a basement floor, it is possible to prepare gang charts for isolated units of work, covering the men of different trades involved in mixing and placing concrete.

Value of charts

Charts like this can be compiled to serve as a file record of how unit costs have been arrived at for an estimate, and they form a particularly useful record if the same unit costs are used again on other work. The estimator can compile an over-all cost, for in-

stance, for placing a cubic yard of concrete for a substructure foundation, then file the chart for future reference. Obviously this has advantages over the practice of compiling a cost per cubic yard in place for a specific job, using just scrap paper, then throwing away the paper—the supporting data for the unit price used in the estimate. If the estimator is questioned about how he arrived at the price, he has no record to show.

If process charts or gang process charts are unnecessary for a particular piece of work, a simple tabulation can be made and either filed or attached to the estimate. This tabulation would show the labor involved in all units of a particular operation, the hours spent on each work unit, the rate paid to workmen, and the total cost of each work unit.

Making the charts

Compiling a chart is relatively simple on the printed forms. Each chart should be numbered as it is prepared. Under "Operation", describe the class of construction; under "Location", enter the name of the town or a description of the work site. A blank is left for the operation number for convenience in compiling records on a job. All items included in the composite price are detailed under "Subject". The first and second number of the cost code being used are entered under "Code", and the number of the contract on which the record is being made is filled in under "Cont. No." The blank, "Date", refers to the date the data is compiled, and "Department" refers to the class of labor—carpenters, masons, or others—doing the bulk of the work. "Unit" refers to the base unit on which prices are to be secured. In figure 2, the unit is the price per cubic yard of concrete. "Am't Work in Cycle" is the amount of concrete to be placed. "Present" and "Proposed" designate either that the work is actually being done or that the compilation is a theoretical one. Mechanical equipment used to complete the work are listed briefly under "Plant".

The name of the person securing the data is filled in under "Charted By". The blank, "Sheet", is for convenience in case more than one sheet is used to chart the work. Rates for each gang member are posted under "Hourly Rate". The name of the superintendent or project manager is filled in under "Supt.", and the blank for "Foreman" is for his name.

"No. in Group" refers to the total number of members in the gang, and "Distance Traveled" to the distance men or materials have to be transported. The actual time spent in minutes, entered in the next column, refers to the time spent by one member of the gang only. To find the time spent by the entire gang, the number of minutes are multiplied by the number of men in the gang. The trade classification of each gang member is listed in the columns that follow across the sheet.

The cost of each step in the work cycle is posted under "Cost per Step", and the amount of work in each step is posted under "Am't per step". The column labeled "No." is for the number of steps in the cycle. The "Step-Description" column is for a brief statement of each step in the cycle. Totals of all the vertical columns can be made at the bottom of the sheet. The summary box at the right hand corner of the sheet is for posting the number of operations, transportations, delays, inspections, and the unit cost.

Helps planning

Like the process chart, the gang process chart will raise a lot of questions about whether or not the job can be made simpler and more economical. Like process charts, too, gang

process charts can be analyzed with a view to eliminating unnecessary operations and idle time, and consolidating other operations.

One of the things to question on the first step shown in figure 2 is whether it was necessary for the foreman to spend two hours assembling tools, equipment, and materials. The chart also shows that the truck and driver were tied up for two hours. Two questions arise here: was this economical? Could the truck have been used elsewhere during this time?

Step 2 in the chart shows idle time. This should be eliminated. Checking the causes of this idle time reveals that the truck driver wasted 20 minutes while the rest of the gang were setting grade stake on Step No. 2. Among other things, it revealed that while the laborer was mixing the topping, the cement finisher lost two hours because the concrete was placed too wet and it had to dry to take the topping. Actually, the concrete was placed too wet deliberately, in order to throw the finishing operation into overtime rates. Altogether, the total loss for idle time was $10.53 on this operation, and amounted to nearly a dollar per yard of concrete placed or 4 per cent of the total job unit. Idle time can be cut down, but never eliminated, so it will be wise for the estimator to make allowances for it in any operation.

Each succeeding step in this operation can be subjected to the same kind of analysis, and if something is out of line—say the unit cost of a step is too high or there is too much time being lost—the reason can usually be found and steps taken to remedy the situation.

While it is better to make separate charts for excavation, fine grading, mixing, and concrete placement on work like this, the over-all price per cubic yard of concrete is many times demanded in the invitation for bids, and in these cases, the more complex chart may be used. Individual chart units, however, can be added together to get a total for a composite price. One of the biggest advantages in the latter procedure is that all necessary steps in the entire job will be covered by the estimate price for the work.

(Next month's article will deal with "The Engineering Department—Estimating for demolition, land clearing, pile driving.")

A few blows with a hammer is all the power required to drive fasteners into concrete and masonry with the Omark hand-fastening tool.

New tool drives "nails" in concrete with hammer

■ A new hand tool that will drive special, hardened steel drivepins into concrete and other materials with a hammer is announced by Omark Industries. The Omark hammer-drive hand fastening tool requires no outside power source and does the job in a few seconds, according to the manufacturer.

The special drivepin "nail" is inserted into the barrel of the tool from the bottom. A plastic, disposable washer holds the pin in place while it is being driven. A driving ram is pushed into the barrel of the tool from the top. The tool is then placed against the concrete and the driving ram head is struck with the hammer.

The Omark tool is recommended for light fastening to concrete, masonry, concrete or cinder block, and mild steel. According to the manufacturer, the ballistic point design of the drivepin assures easy penetration and a firmly seated fastening.

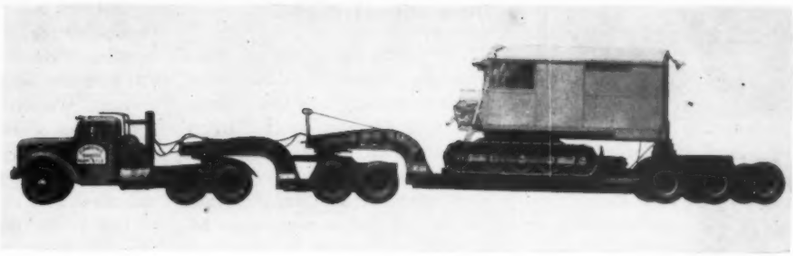
For further information about the tool write to Omark Industries, 5001 S. E. Johnson Creek Blvd., Portland 6, Oreg., or use the Request Card at page 18. Circle No. 7.

Rubber, steel compactor

■ The Seaman Duo-Pactor is fully explained in a catalog from the Seaman-Gunnison Corp. Various models of the combination pneumatic-tire and steel-wheel rollers are pictured and described. Diagrams illustrate the principles of duopaction, the rolling pattern, and the area covered. Operation and maintenance information, together with case histories, conclude the catalog.

To obtain the catalog write to the Seaman-Gunnison Corp., 2763 S. 27th St., Milwaukee 15, Wis., or use the Request Card that is bound in at page 18. Circle No. 64.

A calendar of meetings of interest to our readers appears on page 19 of this issue.



WHEN THE LEONARD BROS. TRANSFER AND STORAGE CO. was faced with the job of moving a Lorain crawler crane over the highway for one of its clients, the Miami, Fla., firm decided to utilize its Talbert Model T3D-70-RG-RA low-bed trailer. The basic trailer features a removable gooseneck, a removable rear axle assembly, and a removable third axle. Also employed on the heavy moving job was a tandem jeep dolly, consisting of a removable gooseneck, a removable axle assembly with a fifth wheel, and several stub beams. According to the manufacturer the arrangement of the various units of Talbert Equipment did the job safely, easily, and economically. Talbert trailers are available in capacities of from 10 to 100 tons. The Leonard Bros. trailer is in the 70-ton class. For more information on Talbert trailers and hauling assemblies circle No. 150 on the Request Card at page 18, or write to **Talbert Trailers, Inc.**, 7950 W. 47th St., Lyons, Ill.

Progress of architecture detailed in new book

To provide refreshing ideas for architects is the main objective of Volume 1 of "Design in Civil Architecture" by Sir Albert Richardson and Hector O. Corfiato. The book covers the general conception of architectural design, as well as the workings of elevations and sections.

Brief chapters at the beginning of the book discuss elevational treatments, variety in the composition of facades, the focal point in elevations, and the elevational systems in architecture. The remainder of the 216-page book illustrates national, European, and Asiatic types of architecture. Captions for illustrations are in English, French and Russian.

The book is priced at $15, and may be purchased from the Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y.

American-Marietta expands its operations

American-Marietta Co. of Chicago, Ill., has acquired the Dragon Cement Co., New York, N. Y. Dragon, which has an annual cement production of 4.5 million barrels, will operate as a division of American-Marietta.

manufacturer memos

The new president of Oshkosh Motor Truck, Inc., Oshkosh, Wis., John P. Mosling.

John P. Mosling succeeds father as Oshkosh president

John P. Mosling has succeeded his father, B. A. Mosling, as president of Oshkosh Motor Truck, Inc., Oshkosh, Wis.

When John Mosling started working for the firm, one of his first jobs was as a driver, delivering trucks to dealers throughout the country. From 1937 to 1940, he was one of the company's sales representatives. He became assistant sales manager in 1940, sales manager in 1942, vice president in 1950, and executive vice president in 1953.

B. A. Mosling, who has been made chairman of the board, was one of the incorporators of the Wisconsin Duplex Co. in 1917. This firm became the Oshkosh Motor Truck Company.

Name product managers for Seaman-Andwall lines

Seaman-Andwall Corp., Milwaukee, Wis., has a new product manager for its line of Century material spreaders in Frank D'Amato.

With Century Engineering Co., Waukesha, Wis., for eight years prior to the purchase of that company's line of material spreaders by Seaman-Andwall, D'Amato will now spend most of his time working with contractors, highway engineers, and distributors throughout the country.

C. Frank Riddle has been made the product manager for the Pulvi-Loader division of the firm. Previously, he had been design and sales engineer for the Willimon Mobile-Loader, formerly made by J. R. Prewitt & Sons, Pleasant Hill, Mo., and now manufactured by Seaman-Andwall.

Le Roi appoints chief metallurgist

Don Blackmar has been appointed chief metallurgist of the Le Roi Division of Westinghouse Air Brake Co., Milwaukee, Wis. He will be in charge of the newly established Le Roi metallurgical and chemical laboratory, establishing material and process specifications and advising the engineering and production department.

Blackmar, who received his bachelor and master of science degrees from the Michigan College of Mining and Technology, is a member of the American Society for Testing Materials, the American Institute of Mining and Metallurgical Engineers, and the American Society for Metals.

Thew Shovel news

J. H. Smith has joined the Thew Shovel Co., Lorain, Ohio, as resident patent attorney and new-product analyst. In his new position, Smith will handle all patent liaison work and offer patent consultation service to members of the company, and will also function as coordinator between all departments in the consideration, development, and complete analysis of new products.

Prior to joining Thew, Smith had practiced patent law in the Chicago, Ill., area and had served as a consultant in research.

The firm has established a wholly owned Dutch subsidiary. The new company, known as Lorain Holland, N. V., is located in The Hague, Netherlands. Warren B. Weston, director of overseas operations for Thew, will also be managing director of the new company. F. S. Battin will be sales manager.

Full production is expected to be underway by January, 1957.

Oliver Corp. elects

Alva W. Phelps has been elected president of the Oliver Corp., Chicago, Ill. Phelps, who has been a chief executive officer since 1944, will continue to hold the position of chairman of the board of directors, a post he has held for the past six years.

At the same time, Carl L. Hecker, who has been the firm's first vice president since 1952, was elected executive vice president.

Hyster appoints manager; district representatives

The Hyster Co., Portland, Oreg., has appointed Duane A. Kragrud the eastern division parts and service manager. He will make his headquarters at the Danville, Ill., plant, supervising

parts and service operations for the firm's industrial truck and tractor equipment divisions.

At the same time Robert A. Fletcher and L. Kenneth Bliss have been named district representatives in the Eastern Division Tractor Equipment Sales Department. Fletcher will call on dealers in 11 North Central states and four provinces in Canada. His territory was previously covered by Richard M. Ervin, who will now be the Industrial Truck Division district manager in the Washington, D. C., area.

L. Kenneth Bliss will work with dealers in 13 Northeastern states and certain provinces in Northeastern Canada. Bliss' territory was formerly handled by Charles P. Gruet, who now manages Hyster's Manhattan sales office.

Klein and Voegeli fill important A-C posts

W. J. Klein has been made vice president and director of sales, and W. L. Voegeli, general sales manager, for the Tractor Group of Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Klein, formerly vice president and general sales manager of the Tractor Group, became affiliated with Allis-Chalmers in 1928 as a salesman at the Sioux Falls, S. Dak., branch. He was made a special factory representative in 1929, and a year afterward he opened the company's branch at Minneapolis as branch manager. He was transferred to the home office as general sales manager in 1953.

The new general sales manager for the Tractor Group of Allis-Chalmers, W. L. Voegeli.

Vice president and director of sales for the Tractor Group, W. J. Klein.

Voegeli, until now assistant director of engineering, started working for Allis-Chalmers in 1935 as a serviceman, and became a member of the home office service department staff the following year. He became assistant director of engineering for the organization in 1952.

Frank C. McManus elected president of Anthony Co.

Frank C. McManus has been elected president of the Anthony Co., Streator, Ill., manufacturer of hoists, dump bodies, lift gates, and dump trailers. He succeeds Glenn A. Duis.

Mr. McManus was associated for twenty years with the Mack Truck Co. as an engineer and factory manager, and had also been a division manager with the Fuller Mfg. Co. He is a member of the Society of Automotive Engineers and the American Quality Control Society.

Detroit Diesel establishes six regional headquarters

The Detroit Diesel Engine Division of General Motors Corp., Detroit, Mich., has established six regional offices in key cities throughout the country. L. A. Steele is the manager of the office for the New York region, located at the Coliseum Office Bldg., 10 Columbus Circle, New York City. The Atlanta, Ga., region, managed by R. W. Phillips, has its offices at 619 Fulton National Bank Bldg., Atlanta. J. C. Campbell is manager of the Wayne, Mich., office at 36501 Van Born Road. This office will service the Detroit region.

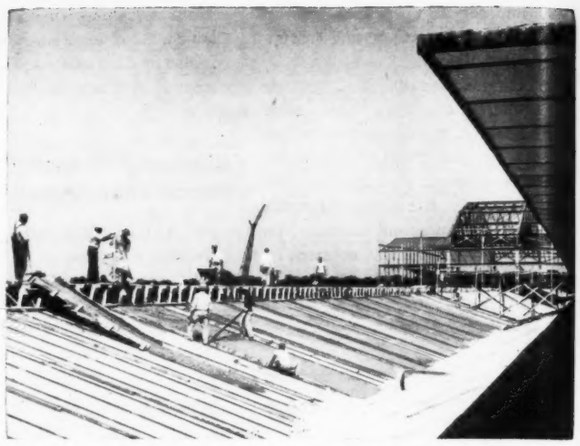
The Chicago regional office, managed by D. E. Schwendemann, is located at Avenue State Bank Bldg., 112 N. Oak Park Ave., Oak Park, Ill. Eric Sutton, manager of the Southwestern region, has his headquarters at 1717 Adolphus Tower, Dallas, Texas. The Western region is managed by R. L. Burpee with headquarters at 1426 Russ Bldg., San Francisco, Calif.

Black & Decker opens new Belgium plant

A new warehouse, service, and sales subsidiary in Brussels, Belgium, has been opened by the Black & Decker Mfg. Co., Towson, Md., manufacturers of portable electric tools. The company, called Black & Decker (Belgium) S. A., will distribute a complete line of tools throughout the Belgium-Luxembourg area.

Operations in the new company are under the direction of John Meredith, export sales manager of the British subsidiary in Harmondsworth. M. F. G. Wright, also of Harmondsworth, is the manager.

←For more facts, circle No. 287



Workmen pour perlite concrete over the 32×48-inch Johns-Manville cement-asbestos formboard on the roof of an exhibition wing. Standard 4×8-inch 12×14-gage galvanized wire mesh was used for reinforcing.

Lightweight aggregate used for concrete roof decks

A 25 per cent reduction in the dead-load weight and a 100 per cent increase in insulation have been realized through the use of concrete roof decking made with lightweight perlite aggregate in the construction of the Kentucky Fair and Exposition Center near Louisville. The fairgrounds opened for business in September, hosting the annual Kentucky State Fair, although all the facilities had not yet been completed.

Located five miles from downtown Louisville near the Standiford Field airport, the fairgrounds cover 350 acres that spread out from a central group of interconnected buildings. This group consists of a coliseum with an arena seating 12,000, a pair of large exhibition wings, and three smaller exhibition and administrative annexes. An athletic stadium with a seating capacity of 20,000 is located behind the group of exhibition buildings and a race track and stables will be completed next year.

The Virginia Engineering Co., Newport News, Va., holds the $5 million contract for the bulk of Phase I of the construction, which includes the buildings, the stables, and the track. The roofing project, encompassing the placing of bulb tees, formboard, wire-mesh reinforcing, and perlite concrete, was handled by the J. B. Eurell Co., Lansdowne, Pa. Fred Elswick & Assoc., Louisville, is the architectural firm and E. R. Ronald & Assoc., also of Louisville, the engineering firm. Contract awards for the entire project, supervised by the Kentucky State Property and Building

◄ Stockpiles of formboard, cement and perlite aggregate surround the 16-cubic foot mixer in the infield of what became the arena of the coliseum. The hoist tower extends up through the steel-work of the structure, which has a 295-foot clear span and rises 90 feet above ground level. A ceiling composed of suspended 4-foot aluminum squares backed with Fiberglas was placed over the arena.

Covers coliseum and exhibition structures at fair and exposition center in Louisville

Commission, came to a total of nearly $10 million.

Coliseum has 295-foot clear span

The central structure in the group of exhibition buildings is the coliseum, 468 feet long and 90 feet high, with a 295-foot clear span. The two large wings each measure 589×315 feet. There are smaller annexes to either side of the entrance end of the coliseum and a 186×65-foot annex running at a right angle to the far end of one of the large wings. A total of 17 acres of perlite concrete was used on the group of buildings.

Perlite is a siliceous volcanic rock mined in the western United States. When crushed and quickly heated to above 1,500 degrees F, it expands to form the light, non-combustible, glass-like particles of a cellular structure. White or light gray in color, it weighs about one-tenth as much as sand or gravel. The many glass-sealed cells in each particle of expanded perlite make it highly insulative as well as comparatively non-absorptive. It mixes with about one-quarter less water than comparable lightweight aggregates.

Approximately 5,000 tons of structural steel for the exhibition buildings were fabricated and erected by the American Bridge Division of the U. S. Steel Corp. In most areas the roof deck was constructed of 2½ inches of perlite concrete cast in place over ¼-inch formboard supported by bulb tees on 32 ⅝-inch centers.

Formboard acts as ceiling

Johns-Manville 32×48-inch cement-asbestos formboard was used. The underside of the light gray formboard was left uncovered to create a light-reflecting ceiling. Standard 4×8-inch 12×14-gage galvanized wire mesh, manufactured by the American Steel & Wire Co. and the Pittsburgh Steel Co., was used for reinforcing the deck. It had a minimum 6-inch end lap and no side lap. The 12-gage longitudinal wires were placed perpendicular to the bulb tees.

Due to the extensiveness of the decking project—it required enough perlite to make approximately 5,700 cubic yards of concrete—no one source was able to supply all the

(*Continued on next page*)

lightweight aggregate to meet the construction schedule. The perlite came from F. E. Schlunder & Co., Inc., Joliet, Ill.; the Tennessee Products & Chemical Corp., Nashville, Tenn.; and the Indoken Perlite Co., Cincinnati, Ohio.

The aggregate was delivered in multi-walled paper bags of 4-cubic-foot capacity, each weighing 32 pounds. Because of the large bulk and low weight of the material, closed trailers, similar to moving vans, were used to transport it. One supplier delivered aggregate in a fleet of drop-frame Fruehauf trailers that carried 650 bags each. Another used 32-foot single-axle vans with 420-bag capacities. The perlite suppliers unloaded the aggregate at stockpiles adjacent to a Ransome 16-cubic-foot mixer.

A Buck hoist with a self-raising tower, powered by a 15-hp engine, elevated the concrete to roof level. The bucket discharged into a hopper which filled 2-wheel concrete buggies that carried the mix to the pouring point. Because of the pitch of the decks, a network of wooden runways was erected to accommodate the buggies.

Low-slump mix used

A 1 to 5 mix (one bag of cement, 5 cubic feet of perlite, and 1½ pints of neutralized Vinsol resin air-entraining agent) gave the desired balance between structural strength and insulating value. A minimum of water was used to produce a low-slump mix that would not slide off the steeply-sloped decks. Only water was used in the curing process. The slab was kept moist for three days after the pour by several daily sprinklings with a hose.

Using a wooden screed, a workman levels the perlite concrete after it has been poured.

After 28 days, the perlite concrete developed a compressive strength of 270 psi. It had a U factor of 0.19, compared to a U factor of 0.40 for a gypsum-concrete slab of the same thickness, a 100 per cent gain in insulation. It weighed 9.2 pounds per square foot, compared with 12.2 pounds per square foot for gypsum-

concrete, nearly a 25 per cent reduction in dead-load weight.

The perlite concrete was also used in constructing the curbs and saddles used to control drainage on the sawtooth roofs of the exhibition wings. The saddles consisted essentially of 20-gage metal topped with a 3-inch thickness of concrete. For greater strength, a 1 to 4 mix, with one pint of the air-entraining agent, was used. The mix developed an approximate compressive strength of 440 psi in 28 days.

The arena in the coliseum has a ceiling composed of suspended 4-foot aluminum squares backed with Fiberglas. The exterior walls of the buildings are brick and granite with limestone coping. The inside walls are brick and concrete block faced with glazed tile. The structural columns are finished with granite. THE END

Diesel tractor shovel

■ The structural features of the Allis-Chalmers HD-6G diesel-powered tractor shovel are discussed in a catalog from the company. Also reviewed is the shovel's hydraulic system. According to the specification chart, the HD-6G weighs 19,600 pounds, has a 1½-cubic yard capacity, and operates on a 57-hp engine. Photographs, charts, and lists of accessories are included in the catalog.

To obtain the catalog write to Allis-Chalmers Mfg. Co., Milwaukee 1, Wis., or use the Request Card at page 18. Circle No. 23.

Tractor parts

■ Alloy steel tractor replacement parts are discussed in a bulletin from the AMSCO Division of the American Brake Shoe Co. The advantages of the parts in track shoes, scraper blades, end bits, sprocket and idler rims, and grouser bars are described and illustrated. Data is also included on the proper procedure for welding replacement steel sprocket or idler rims.

To obtain Bulletin TP-1 write to the AMSCO Division, American Brake Shoe Co., Dept. T, Chicago Heights, Ill., or use the Request Card at page 18. Circle No. 24.

White Engineering elects Phelps vice president

Dudley F. Phelps has been elected chief executive officer and vice president of engineering for the J. G. White Engineering Corp., New York, N. Y. A 16-year veteran with the firm, Phelps was in charge of the mechanical division, was chief mechanical engineer, and prior to his election, was the firm's engineering manager.

Weather charts

The weather outlook for December

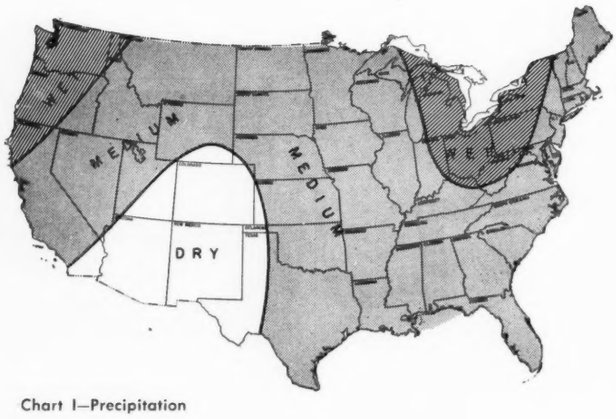


Chart I—Precipitation

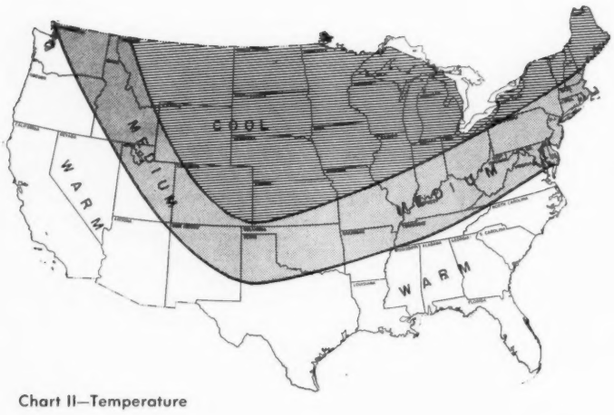


Chart II—Temperature

The two accompanying weather maps indicate the average weather conditions to be expected throughout the United States during the month of December. Chart I classifies precipitation, and Chart II indicates the temperature range to be expected during the month.

Dry areas, as indicated on Chart I, will probably have less than 6 days of precipitation. Between 6 and 12 rainy days can be expected in medium areas; and wet areas will average more than 12 days of precipitation.

Warm areas indicated on Chart II will average 10 days or less with minimum temperatures 32 degrees or lower. Medium areas will have 10 to 22 such days; and cool areas can expect over 22 days of freezing.

The charts may be used in a relative sense. For example, a contractor on a concrete-pouring job will find, from Chart II, that he will have, on the average, more working days in southern Vermont than he would in western New York State, or that he will have more working days in northeastern Texas than he would in the northwestern part of the state. Chart I shows that eastern Indiana, on the average, will be wetter than the western part of that state, while most of New York State will have more precipitation than will New England.

Prepared for CONTRACTORS AND ENGINEERS by the Weather Corp. of America, 39 Broadway, New York, N. Y., and 611 Olive St., St. Louis, Mo., the charts show average conditions, and are not intended as specific forecasts. Weather Corp. of America will answer any questions pertaining to the charts, or to other applications of meteorology or climatology to the construction industry. THE END

Text explains process of induction heating

A handbook entitled "Induction Heating Practice" explains the application of the high-frequency induction heating process in regard to industrial problems.

The book, written by D. Warburton-Brown, covers such topics as work coils and inductors; soldering, brazing, and hardening by induction methods; and gear hardening. Miscellaneous applications, the component design for induction heating, and the locating of jigs and handling of fixtures conclude the text. Graphs diagrams, photographs, and formulas supplement the material.

Published by the Philosophical Library, Inc., 15 E. 40th St., New York 16, N. Y., the book is priced at $10.

Trailer-tractor unit

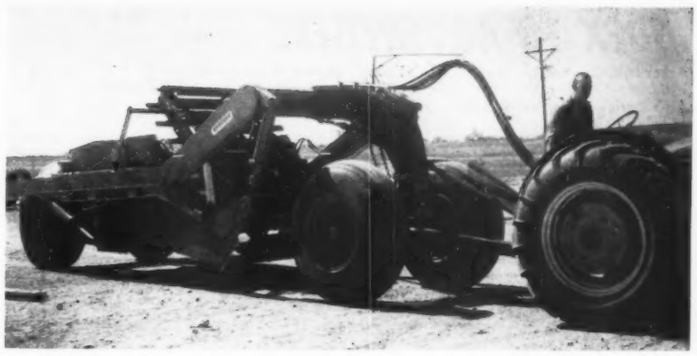
■ A folder featuring the Anthony Frameless trailer is available from the Anthony Co. According to the folder, the single-axle trailer unit with a single-axle tractor will haul up to 4,000 pounds more legal payload than a tandem axle dump truck. Inch worm traction, stability, and maneuverability are discussed.

To obtain the folder write to the Anthony Co., Dept. 135, Streator, Ill., or use the Request Card at page 18, Circle No. 21.

Kuljian Corp. appoints highway division head

George R. Halton has been appointed head of the Highway and Airport Division of the Kuljian Corp., engineers and constructors of Philadelphia, Pa. Halton will supervise the planning and development of airports, highways, expressways, and their adjoining structures and facilities.

Halton has worked on such projects as the Garden State Parkway in New Jersey, the New York Thruway, the New Jersey Turnpike, Newark, N. J., airport, and La Guardia Airport in New York. He has also taught graduate courses in foundation engineering at the Polytechnic Institute of Brooklyn, N. Y. Halton is a member of the American Society of Civil Engineers, the National Society of Professional Engineers, the Highway Research Board, and the American Road Builders' Association.



UP TO 200 YARDS OF EARTH PER HOUR, depending on the length of the haul, can be moved with this 10-yard elevating scraper manufactured by the Hancock Mfg. Co. The rig is one of several in a construction series of elevating scrapers which has been added to the Hancock line. The units are available for mounting directly to tractors, or with front axle and wheels, for use as pull-type scrapers. The elevators are powered either by the tractor's power takeoff or by an auxiliary engine or electric motor. The depth of cut can be adjusted from ½ to 6 inches. Those scrapers using the front axle have an adjustment which permits controlled weight distribution on the tractor's pulling wheels for added traction. For more details on the elevating scrapers write to the **Hancock Mfg. Co.**, P. O. Box 1359, Lubbock, Texas, or use the Request Card at page 18. Circle No. 88.

Night driving; culvert-flow topics of HRB bulletins

Two bulletins from the Highway Research Board discuss night visibility and culvert-flow characteristics. The results of tests on night sign brightness, the level of illumination to which the eye is adapted, characteristics of letters, and contrast direction is presented in the first paper, which is one of seven on night visibility. Methods and results of tests on candle power of rear lights on trucks, and the specifications and performance of a sealed-beam headlamp for automobiles comprise the second and third papers.

The fourth paper presents the results of road tests on night visibility through heat-absorbing glass; and the fifth gives the effects of tinted optical media. Visual efficiency in monocular driving and reduction of visibility caused by oncoming headlights are the subjects of the sixth and seventh papers.

The first paper in the bulletin on culvert-flow characteristics illustrates typical water-surface profiles which can occur in culverts. The second paper reports on tests performed on model culverts.

The bulletin on night visibility is priced at $1.20, and the other at 60 cents. Both bulletins may be had by writing to the Highway Research Board, 2101 Constitution Ave., Washington 25, D. C.

Film on Hyster roller

Roadbuilding with the Hyster Grid roller is shown in a 16-mm sound color film. Filmed by Hyster engineers on turnpikes, secondary roads, and farm-to-market roads, the roller is shown working on embankment compaction and crushing pit-run rock for surface and base courses.

Free showings of "Roadbuilding with the Hyster Grid Roller" can be arranged by the Hyster Co., 1800 N. Adams St., Peoria 1, Ill., or 2902 N. E. Clackamas St., Portland 8, Oreg.

(advertisement)

OLD WORLD TREASURES RECLAIMED FOR NEW CHICAGO LANDMARKS

Chicago, Illinois — The wrecking of many old dwellings in Chicago to make way for the new super motor expressways has proved to be a bonanza for alert interior decorators.

Present day decorating schemes combine the old and the new — the modern to give brightness and, from the condemned houses that stood in the way of these expressways, the traditional lamps, lanterns, shutters, doors, gratings, iron scrolls, stairways and leaded glass windows add grace and stability of the past.

Much of this newfound treasure is centuries old. It was imported from Europe by immigrants when they built their new residences to remind them of their old world home and villages.

This is the story behind the setting of Samuel Leeds' "The Little Square" in his Hotel Hamilton, 20 South Dearborn St. He has constructed a facsimile of a quaint old world, piazza using interesting materials and handiwork from these abandoned buildings. While the word piazza could mislead you into thinking "The Little Square" is Italian it could be a cafe on a Paris street or a patio in Spain since the decor, gathered from many locations, colorfully incorporates all three.

An added romantic touch is in the center of this old world courtyard. It is a fountain unearthed from the lava covered village of Ostia, Italy, which was destroyed by Mt. Vesuvius. Tradition has it that couples who pledge their devotion at this fountain are blessed with eternal love. To seal their pledge the lovers may drink a special potion named simply, but descriptively, a "Lovers Delight", which was created by Michael Lafrumento, a forgotten romanticist of this period.

Romance with an Old World atmosphere is still alive in Chicago, thanks largely to these old treasures saved from the march of progress.

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Surveying washington

by HUBERT KELLEY, Jr.

The shortage of construction engineers is generally conceded to be the big potential stumbling block to the orderly progression of the 13-year federal-aid highway building program. An indication of this manpower problem is the Labor Department's report that the backlog of job orders for engineers has shown an "almost steady rise" since 1954. Unfilled orders have substantially increased this year at local public employment offices, despite the 1956 graduation of an estimated 30,000 engineers from our schools.

The Automotive Safety Foundation estimates that at least an additional 1,200 engineers must be recruited to meet the nation's highway and traffic control needs.

The long-range solution to this is to train more engineers. But the demands of the road program are immediate, and the only logical approach now is to make better use of existing highway engineering manpower.

Aware of this fact, the government has already developed a program to conserve the resources represented by the technicians now available. A. C. Clark, deputy commissioner of the U. S. Bureau of Public Roads, points out that the early allocation of highway funds is a step in the right direction. "Early allocation defines the size of the road program and the engineering job load," he said. "It encourages better planning of work schedules and better assignment and utilization of engineers".

The road construction industry, he states, is also cooperating in a program of adopting new electronic aids, photogrammetry, and other devices to increase engineering productivity. Electronic computors are being used by more and more state highway departments, he adds, with resultant savings in engineering time.

Clark claims that a provision in the 1956 Highway Act authorizing advance acquisition of rights-of-way on predetermined interstate system locations will also help. He points out that highway contractors, in answering a recent survey, cited slowness in acquiring right-of-way and in clearing it of utilities as one of the major factors most likely to hold back their work.

"Obviously, a construction project, on which work begins promptly after a contract award, prosecuted diligently, and completed in a reasonable time, will require engineering time for a minimum period," Clark concluded.

No wholesale reconstruction of commercial airport landing strips to accommodate jets is foreseen by James T. Pyle, acting administrator of the Civil Aeronautics Administration. Jet transports, he declares, will be able to approach and land at speeds not much above those of present liners and only trans-ocean planes will require longer runways.

"We expect most jet flights to follow much the same pattern as present-day transports," Pyle continues. "That means that the bulk of jet flights will be over moderate distances. Taking off with partly filled fuel tanks, the jet transport can accommodate itself to the runways now existing at the larger municipal airports".

Pyle admits that it "may be necessary to add to the paving thickness at some airports, particularly if the jet transports are heavily loaded". However he adds, "the wheels of the new aircraft are widely spaced so that they spread the weight over large areas of pavement. The runway problem, from a load-bearing standpoint, does not appear to present us with any immediate crises."

As for the effect of jet blast and fuel spillage on runway paving, he states that on the basis of CAA investigations to date it does not appear they will do "any great amount of damage".

In regard to the problem of runway damage, the Asphalt Institute has filed a stiff protest with the House Armed Services Committee against the Air Force's practice of insisting on all-concrete runways. It is claimed that the Air Force ignored the committee's findings that asphalt and concrete were equally satisfactory for such purposes. Consequently the Institute asks that purchasing decisions between the two materials be made on the basis of price.

The Air Force has charged that asphalt pavements have been damaged at certain installations. The Institute countered by citing what it said were findings by its engineers that faulty

construction, not the asphalt, was the cause of a greater part of the failures.

Another attempt at insuring a portland cement supply for the road program has been made by Sen. Hubert Humphrey, (D. Minn.), who has again asked the Agriculture Department to explore the possibility of bartering surplus farm produce in exchange for portland cement. He said such a program would help meet the "tremendous future cement requirements" generated by the huge highway building authorization.

In reply to his first letter last July the department took the position that barter-acquired materials "should be insulated from the domestic market by transferring them to the supplemental stockpile, unless such materials were acquired . . . to meet the requirements of other government agencies". The senator replied that the Bureau of Public Roads has a "definite need for huge amounts of portland cement".

The demand for housing expected in the years ahead is highlighted by the Census Bureau expectations of household formation during the next twenty years. The Bureau estimates that the number of United States households will increase at an annual average rate of from 700,000 to almost one million.

By 1960, according to estimates, households will total between 50.5 and 51.8 million—there were an estimated 47.8 million as of April, 1956. By 1975 the total may be in the range of from 61.6 to 67.4 million.

The figures for future expectations vary because four sets of estimates are presented, each based on a different assumption as to the average rate of future yearly increases in households. But even the most conservative of the projection series—which supposes that the rate will not increase over what it was in the 1950 to 1955 period—points to an almost 30 per cent rise in United States households by 1975.

"Even if there were no further increase in household formation rates," the Census reports, "about 14 million households would be added by 1975 simply because of population growth during the next 20 years".

The report cautions that the projections are not to be interpreted as hard forecasts or predictions but rather as totals "which would result under several reasonable assumptions about future population changes". It is pointed out that all the projections are based on continuation of high employment levels.

For housing contractors and others interested in the housing supply the report has important long-range significance because the number of households is, by definition, the same as the number of occupied dwelling units. The future rise in households is unlikely to be identical with the volume of housing construction during the next twenty years, but the two figures will probably remain parallel. Supply of housing should keep pace with the demand for it.

The Census estimates indicate that the growth in household numbers will not take place at a uniform rate. Up to 1960, the average annual increase will be less than the rate of change that occurred between 1950 and 1955. But the increase indicated for the period 1970 to 1975 will be substantially above the 1950–55 rate.

Non-farm housing seems to be the type that will be predominant in the future. Such households have increased since 1940, but farm homes have declined some 20 per cent, an average of more than one per cent annually. According to the report, this downward trend is apt to continue, with the movement of individuals and families from farms to non-farm areas likely to be the biggest "under conditions of greatest economic prosperity".

THE END

For more facts, circle No. 305→

Costs of city work seem too high?

LOOK HOW SANGAMO CONSTRUCTION CO. CUTS THEM

This well-known 30-year-old Springfield (Illinois) firm, a year ago, had a problem common to most city-area contractors. Moving costs and traffic slow-downs were taking much of the profit out of their municipal work. Small, extra, one-day or weekend jobs, which *could* have built income, often couldn't be handled because their equipment was either too small or too big. Sangamo, however, found a solution. They bought three Michigan Tractor Shovels.

Drive, turn non-stop on narrowest city streets

All these units can be on their way to any kind of loader job in minutes. "These rigs go anywhere," says Clyde Turner, one of Sangamo's job superintendents. "They can run three or four blocks, through auto and truck traffic, in a minute or so. Twenty-seven miles takes only an hour. Rubber tires don't tear up asphalt or oil-mat pavement. They can even go up on a sidewalk without breaking it or the curbing. And our Model 75A's (which are 6′ 8″ wide and 16′ 10″ long) can turn around non-stop on the narrowest city streets."

Does job of bigger machines setting 12 inch sewer pipe

Often, one of the Michigans is assigned to a major job where maneuverability is vital in speeding completion. Preceding photograph shows typical task of this type—laying eight miles of 8, 10, and 12-inch sewer pipe for the city of Decatur (Illinois). Daily—almost hourly—this Model 75A shuttled between *three* crews. Tasks included pushing spoil away from trencher . . . backfilling . . . transporting and laying pipe. At times, it set manholes weighing 1200 to 1500 lbs per ring section. Biggest advantages proved to be speed (a typical half-mile trip took 75 seconds) . . . rugged construction (in a summer of work, no time was lost from the job for repairs) . . . planetary axles (which eliminated all axle breakage despite rugged lifting demands)

Carries 1800 lb water main section

Bigger loads have been no problem for the Michigans, either. Above, the second of Sangamo's 80 hp Model 75A's carries an 1,800 lb, 18 ft section of 20 inch water main. This unit *can* lift 8,000 lbs while standing still . . . can carry 4,000 lbs at 4 mph.

Clears, loads 1,000 yards of rubble in 1½ days

Sangamo's third Michigan Tractor Shovel, a 95 hp, 1⅝ yard Model 125A, also handles assignments where speed is important. Here it's on a historical job in Springfield—clearing the wreckage of Illinois' first governor's mansion to make way for a parking lot. Entire 1,000 cubic yards of rubble and dirt was piled and loaded out in 1½ days. Sangamo Construction bought this machine, their first Michigan Tractor Shovel, after having it demonstrated (to quote Company President, Bill Kewley) "on the toughest tractor shovel work we could find—digging up wet rocky ground to improve drainage around a Springfield sewage treatment plant. Later," Kewley continues, "it proved so handy and so dependable, all our crews wanted one. So, in [illegible] months, we bought our second Michigan and, 3 months later, our third."

Stockpiling gravel is another job for the busy Model 125A. While at this city-located yard, rig sometimes loads trucks and railroad cars, feeds the crusher, does cleanup. Its standard 1⅝ yard bucket, incidentally, is interchangeable with 2 yard light-material bucket. The model 75A's standard 1 yard bucket inter-

changes with ¾ and 1½ yard sizes. Both models can also be equipped with crane hooks, fork lifts, backfiller blades, scarifiers and root rakes. For small jobs, you can get a Michigan Model 12B with 6, 10, 15, 20, or 27 cubic *foot* capacity . . . for big jobs you can get a Michigan Model 175A with 1⅝, 2, 2¼ (standard), 3 or 5 cubic *yard* capacity.

Michigan is a registered trade-mark of

CLARK EQUIPMENT COMPANY
Construction Machinery Division
2407 Pipestone Road
Benton Harbor 35, Michigan

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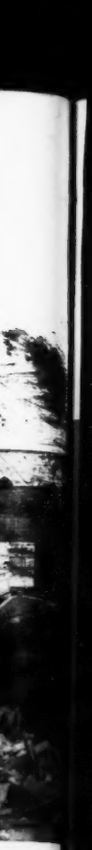

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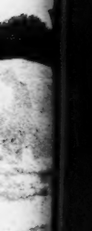

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